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C.M.A. Annual Meeting, April 30-May 3, 1950, San Diego

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No. 1

Gastrointestinal Allergic Disease

CHESTER M. JONES, M.D.,* Boston

SUMMARY

Gastrointestinal allergic disease undoubtedly does exist, but its frequency has been tremendously overrated. It is believed that in many cases there is not sufficient evidence for attributing chronic, recurrent digestive disturbances to allergic reaction, and that skepticism is particularly important because such a diagnosis exposes the patient to an unwarranted type of dietary management that is complicated, frequently unwise, and not too infrequently used as a substitute for critical clinical thinking.

The demonstration and subsequent elimination of allergic substances that may at times be productive of digestive symptoms is, of course, important, and when based on proper evaluation of a carefully taken history will undoubtedly yield brilliant results.

THE only cases that may properly be classified as allergic disease of the digestive tract are those in which there is a tissue change in some portion of the alimentary canal caused by an antigen-antibody cell reaction. Such an alteration is entirely analogous to the wheal reaction in urticaria or the bronchial changes incident to an attack of bronchial asthma. It represents the reaction of a tissue sensitized to a specific allergen. It is essentially a reversible reaction and one which is reproducible following adequate exposure to the given allergen. As pointed out by Cooke, the mistake must not be made

of considering allergic reaction to food and gastrointestinal allergic diseases as synonymous. Nor should the digestive symptoms encountered during other allergic disturbances, such as bronchial asthma, be of necessity laid to true gastrointestinal allergic disease. In many, if not in most such instances, the coexistent indigestion and dyspepsia are due primarily to autonomic nerve disturbances. Heartburn, eructation, abdominal distress and similar symptoms are commonly encountered in asthmatic patients during critical or even moderately severe attacks, and certain foods are frequently incriminated. With the cessation of the attack, the patient normally finds that the suspected foods may be taken with impunity in the vast majority of cases. That foods may cause skin or bronchial reactions is too well known to require comment. The urticaria caused by the ingestion of such substances as shell fish or strawberries has been recognized for many years. These and similar disturbances are examples of true allergic reactions to food, and such examples may be multiplied almost indefinitely. They do not, however, as a rule, constitute examples properly classified as allergic disease of the digestive tract. Furthermore, general symptoms, such as coated tongue, bad breath, "repeating" after certain foods, and vague dyspeptic disturbances following the ingestion of specific foods have been too frequently interpreted as sensitization phenomena without sufficient care having been taken to rule out all other causes of indigestion.

The exact incidence of true gastrointestinal allergic disease is certainly not known. Despite the insistence of certain observers that allergic disturbance of this kind is common, the author believes that evidence for such opinions is almost completely lacking or is open to serious doubt. During a prolonged conversation with the late Dr. Warren Vaughan, an enthusiastic allergist, he agreed that true allergic disease of the alimentary tract is un

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common. This comment was finally made after a careful perusal of his voluminous personal files. Similarly, Rackemann has informed the author that, according to a strict definition, cases of proven or even strongly suspected gastrointestinal allergic disease are rare in his practice, which consists largely of patients with allergic disorders. Cooke believes that "acute gastrointestinal symptoms with or without systemic evidence (urticaria, asthma) from allergic lesions reasonably assumed to exist in the tract are unusual but not rare." It must be mentioned that certain others entertain quite opposite views on the subject, but it is believed that their impressions are based on a rather uncritical evaluation of the term under discussion.

As an internist especially interested in digestive disorders, the author can only state definitely from his own experience that clearly proven or even reasonably clear examples of gastrointestinal disturbances due solely or mainly to allergic manifestations are very uncommon. Furthermore, the author believes that in adults allergic reactions to food occur with much less frequency than is commonly believed. Again and again patients present themselves with various digestive symptoms that are attributed to positive skin tests without there being any reasonable correlation between the two. Foods to which they are presumed to be sensitive on the basis of dermal reactions are frequently eaten with complete impunity, and what is really needed is a readjustment of eating or other habits rather than the elimination of one or many specific foods.

It is probable that some of the confusion in properly classifying many cases lies in an inadequate conception of the underlying or fundamental tissue changes occurring in the alimentary tract mucosa during an allergic response to specific substances. Experimental and clinical observations have clearly demonstrated the nature of such changes. In sensitized dogs, gastroscopic observations have been made of the gastric mucosa after experimentally produced general allergic shock. The appearance of the mucosa as seen through a gastroscope has been described as that of acute gastritis, with redness, edema, spasm, and hypersecretion; hyperacidity is present. Experimental lesions produced in the guinea pig after anaphylactic shock consisted primarily of petechial hemorrhages. Such changes have been interpreted as general reactions due to circulatory changes, rather than as local tissue reactions that were strictly anaphylactic in nature.

Local anaphylactic changes have been produced in the stomach by topical injection of the antigen in the pyloric area following previous sensitization. These lesions were in the nature of Arthus reactions and were followed by temporary ulceration.

Observations have been made in human beings demonstrating that mucous membrane already exposed at ileostomy and colostomy sites could be sensitized, with local mucosal changes analogous to those elicited in the skin, with the production of edema, hyperemia, and in these instances an increase in motility and mucous secretion. Similarly,

clinical observations on human beings seemed to indicate that during gastric disturbances secondary to an allergic reaction, gastric hypersecretion and hyperacidity occur with at times profound motor disturbances suggesting spasm, hyperperistalsis and, in the small intestine, abnormal segmentation. These changes are in no sense characteristic of an allergic disturbance alone. Rather, they represent a characteristic response at any level of the gastrointestinal tract to abnormal stimulation, whether it be due to local irritation or to the effects of overactivity of the autonomic nervous system.

Careful perusal of Beaumont's original observations and, more particularly, of the recent dramatic studies carried out by Wolff and his collaborators indicates clearly the gastric response to any kind of overstimulation. These changes are entirely comparable to those noted in experimentally produced allergic disturbances and involve motor, secretory and vascular alterations that are common to the entire tract. Edema and hyperemia at any level are always associated with increased smooth muscle activity and increased secretion. These phenomena are identical with those noted by White and the author in the distal colon following local irritation produced by the topical application of hypertonic solutions, soapsuds, turpentine, and solutions of cholinergic drugs, and in no way differ from what was to be noted after the parenteral or oral administration of preparations such as carbaminoylcholine or mecholyl. Furthermore, similar changes were noted by White and the author and by a large number of other observers in cases of so-called "mucous colitis," a disturbance that is fundamentally associated with abdominal discomfort, alterations in bowel activity and local evidences of hyperemia, increased motor irritability and hypersecretion. The local irritation may, in some instances, proceed to a point where mucosal bleeding can be observed. In the vast majority of instances, "mucous colitis" is not a manifestation of an allergic disturbance but rather of abnormal stimulation of the large bowel either by orally ingested irritants or by excessive autonomic stimulation.

Because of the common response of the digestive tract to various types of overstimulation, it is impossible to differentiate alimentary allergic phenomena from those caused by other mechanisms as demonstrated by routine methods of study, such as gastric analysis, radiological measures, gastroscopy or sigmoidoscopy. As a corollary, it is obvious that gastrointestinal symptoms distinctively on an allergic basis cannot be differentiated from those secondary to a multitude of causes that are commonly encountered in the practice of medicine. For this reason, it seems particularly important to stress the necessity for careful and critical evaluation of the history in a patient allegedly suffering from indigestion secondary to allergic causes before subjecting the patient to the dietary restrictions inherent in any elimination regimen. In fact, unless a meticulous history reveals a clean-cut association between specific foods, drugs or other allergens and symp-

toms that are predominantly related to the digestive tract, and unless such symptoms can be reproduced by the ingestion of such specific substances, the diagnosis of gastrointestinal allergic disease should be viewed with grave suspicion.

In the mouth, this presents a relatively simple problem, inasmuch as edema of the tongue, buccal mucous membrane and pharynx, or the occurrence of the lesions of stomatitis can be easily demonstrated following the exhibition of specific substances that can be elicited from a history and much less frequently by skin test. As a rule, in all forms of gastrointestinal allergic disease the importance of skin tests has been tremendously overrated. Esophageal spasm can be the local manifestation of an allergic reaction, but the symptoms are entirely analogous to spasm of the esophagus associated with trigger action of the smooth muscle around a diverticulum, an ulcer or a hiatal hernia, and must be sharply differentiated from these by careful x-ray studies and again by a history of constant association with a given substance or substances. Although it is occasionally true that attacks of peptic ulceration may be precipitated by the eating of specific foods, such occurrences are rare indeed and such an explanation is only occasionally warranted.

Digestive tract symptoms, which may include any or all of the various manifestations of so-called indigestion, if on an allergic basis usually manifest themselves in one of two fashions—either by an almost immediate reaction following the ingestion of specific substances, or by a reaction that is delayed by many hours. The immediate reaction is usually apparent and well recognized by the patient himself, with the result that specific foods or drugs are avoided because of previous experiences. These experiences may or may not be associated with skin or bronchial manifestations and by themselves undoubtedly constitute true gastrointestinal allergic disease. The identity of a delayed reaction is much more difficult to determine, and no diagnosis based on the phenomenon of an allergic disturbance should be entertained until all other possible causes have been eliminated, including those usually classified as functional or psychosomatic in origin.

The frequency with which smooth muscle disturbances occur in the alimentary canal, with associated spasm, hyperemia and excessive secretion secondary to emotional stresses and strains, nervous fatigue and faulty habits of living, is well recognized by most internists. Too frequently, however, there is a tendency to ascribe such disturbances to the ingestion of certain food substances or other "allergens," without adequate investigation. Such an investigation frequently is time-consuming and prolonged by many weeks or months before a final answer is obtained. If allergic factors are responsible for the symptoms, then eventually the taking of a careful food diary will usually establish the causative relationships. Skin tests may occasionally help, but they are often misleading and do not by themselves warrant the placing of patients on restricted diets or so-called elimination diets, many of which are in-

sufficient in calories or vitamin content, particularly if employed over long periods of time. It is just as important to determine the physical and emotional state of a patient when he eats certain foods as to determine what foods he is accustomed to eat or what medicines he takes.

Patients may be allergic to phenolphthalein, cascara and other cathartics, with resulting gastrointestinal as well as skin manifestations. It is equally true, however, that abdominal discomfort may be produced by these substances simply because they are irritants, without any implication of allergic disturbance.

The really important and at times difficult situations that are solely on an allergic basis as relates to the gastrointestinal tract consist in those abdominal emergencies accompanied by intense pain, fever, leukocytosis and not infrequently nausea and vomiting. These attacks simulate surgical emergencies dependent upon partial or complete intestinal obstruction, acute appendicitis, volvulus, intussusception, and the like. Individual instances in which the eventual explanation was found to be an allergic factor are to be met throughout the literature. Their occurrence in the experience of individual physicians is certainly uncommon. In many cases the diagnosis is not apparent until a laparotomy has been performed. A typical example of such an abdominal crisis is to be found in the abdominal attacks associated with so-called Henoch's purpura, a condition predominantly seen in children but which can be encountered at any age.

In those instances in which there has been a previous history of urticaria, purpura or joint manifestations, proper suspicion may be entertained at the time the acute abdominal condition is being evaluated. Even when allergic reaction is suspected, however, a decision in favor of conservative measures is frequently difficult and may be improper. If previous allergic symptoms can be elicited or if at operation a localized area of hyperemia and edema only is found, then it may be possible to establish the etiologic importance of one or more specific substances to which the patient is sensitive. This is the classical type of gastrointestinal allergic disease, which occurs infrequently but is of great interest and serves as a basis for the understanding of other minor symptom complexes.

In a specific disease such as ulcerative colitis, attempts have been made to explain the manifestations of the disease on the basis of allergic difficulties. With a mucous membrane that is not intact, it is highly probable that from time to time sensitization to specific foods, bacteria or drugs may occur in this group. Such sensitization is almost certainly acquired after the onset of the disease and is of importance only as another factor in the control or alleviation of the symptoms of this devastating disease. The danger inherent in thinking that allergy plays an important role in ulcerative colitis lies in the fact that dietary limitations may impose severe nutritional lacks which in themselves are dangerous.

Hypertensive-Ischemic Leg Ulcers

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SUMMARY

Ischemic ulcers of the leg having characteristics different from those of ordinary leg ulcers have been observed in a small number of hypertensive patients, mostly women, during the past few years.

Such ulcers are usually located above the ankle. They begin with a small area of purplish discoloration at the site of slight trauma, and progress to acutely tender ulceration.

In studies of tissue removed from the margin and the base of an ulcer of this kind, obliterative arteriolar sclerotic changes, ischemic-appearing connective tissue and inflammatory changes were noted.

Two additional cases are reported.

IN the course of several years the authors have observed a small number of patients who had painful, ischemic ulcers of the leg that differed from the usual ulcers of the extremities. The lesions occurred in almost every instance in women, and all the patients had a history of hypertensive disease of long duration.

Hines, who first noted the condition in a patient in 1941, published a preliminary report⁴ in 1946 describing the clinical and histopathological features observed in 11 patients with ischemic ulcers occurring in the presence of hypertension. It was thought that the condition might be a new syndrome, and Hines postulated that changes similar to those in the retinal vessels of hypertensive patients were present in the arterioles of the skin and subcutaneous tissues, giving rise to superficial infarctions in the skin. Martorell⁷ and Valls-Serra⁸ at about the same time also reported studies of ischemic-appearing leg ulcers in hypertensive patients. Wright⁹ reviewed these studies and added reports of cases observed by him.

Since the preliminary report in 1946, Hines and Farber⁵ have observed 24 additional patients with hypertensive-ischemic leg ulcers. All but two of the patients were women.

DESCRIPTION OF A TYPICAL LESION

The ulcers are usually located on or above the lateral malleolus and range in size from 1 to 10 cm. in diameter. The border is soft and ill-defined and the base is ischemic-appearing. Usually the ulcer is

superficial and the skin adjacent to it in most cases is normal in appearance. Cutaneous sclerosis is absent; hemosiderosis around the lesion is slight or absent.

DEVELOPMENT AND COURSE OF THE ULCER

Often there is history of slight trauma at the site of the lesion. The first sign is a superficial purplish discoloration, 0.5 to 1 cm. in diameter. This progresses by peripheral extension and the lesion breaks down centrally to form a superficial exquisitely tender ulcer. Healing is very slow and may not occur for four to six months. Rest in bed does not seem to influence the speed of recovery. Pressure dressings, supporting bandages and local antibiotic therapy are sometimes helpful. When healing does occur, the pain rapidly disappears and the only residual defect is a superficial, slightly depigmented scar.

PATHOLOGY

It is generally accepted that a diffuse disturbance of the arterial side of the vascular system exists in hypertension.^{3,1,6} The cutaneous arterioles of patients with essential hypertension reveal sclerotic arteriolar changes identical to those found in the kidneys, retina, muscles and other organs of hypertensive patients.²



Figure 1.—Ischemic ulcer of the leg (Case 1).

From the Division of Dermatology, Department of Medicine, Stanford University School of Medicine.

Presented before the Section on Dermatology at the 78th Annual Session of the California Medical Association, May 8-11, 1949, Los Angeles.

Biopsy specimens taken by excision and punch from the margin and from the base of an ulcer of the kind under discussion reveal arteriolar sclerotic changes. The arterioles are considerably thickened and many occluded. The cutis reveals some homogenization of the connective tissue. Many of the thickened and occluded arterioles are surrounded by a dense infiltration of polymorphonuclear leukocytes. Venules and veins were not thrombosed in the material studied. The sections studied serially revealed consistent obliterative sclerotic arteriolar changes, ischemic-appearing connective tissue, and inflammatory changes.

DIFFERENTIAL DIAGNOSIS

The lesion must be distinguished particularly from chronic pernio, from the ulcerations of livedo reticularis, from stasis ulcers due to chronic venous insufficiency, and from so-called "senile skin ulcers." Before a diagnosis of hypertensive ulcer of the leg is made, the usual causes of leg ulcers should be excluded. Careful examination of the arterial and venous systems should be made. The criteria for the diagnosis of hypertensive-ischemic leg ulcers should include: Hypertension; an ischemic-appearing ulcer unresponsive to conventional therapy; moderate

to severe pain; indolence; typical changes of arteriolar sclerosis pathologically.

In view of the fact that there is as yet little in the literature on this subject, two additional cases of ischemic ulcers of the leg in hypertensive patients are reported here.

CASE REPORTS

CASE 1: A 63-year-old Negro woman entered the Stanford University Hospitals on July 16, 1948, complaining of painful ulceration of the right leg. The lesion was reported to have started six months previously following slight trauma. It gradually enlarged and became increasingly painful. In January 1948 an ulcer had developed over the right Achilles tendon. This lesion was extremely painful but it healed after five months. The left leg had been amputated in 1927 because of severe third degree burns. There was no history of thrombophlebitis, syphilis, use of drugs or of blood dyscrasia.

Upon physical examination, a superficial, ischemic-appearing ulcer on the lateral aspect of the right leg was noted. The base of the ulcer contained indolent granulation tissue and the margin was soft. Slight pressure on the lesion caused exquisite pain. There was no evidence of varicose veins or of chronic venous insufficiency. Arterial pulsations were normal. The blood pressure was 230 mm. of mercury systolic and 120 mm. diastolic. Pronounced sclerosis and narrowing of the retinal arterioles were noted in the ocular fundi. The urine was normal, and results of serologic tests for syphilis were negative. The hemoglobin, erythrocyte and leukocyte determinations were within normal limits. There was no sickling of the erythrocytes. Cultures taken from the ulcer showed a heavy growth of coagulase-positive *Staphylococcus aureus*. Biopsy specimens were taken from the ulcer and from skin adjacent to it.

The lesion was treated by bed rest, topical applications of antibiotics and supporting bandages. The ulcer gradually became less painful and after seven months was completely healed.

CASE 2: A 60-year-old white woman was first examined at the Stanford University Hospitals Nov. 23, 1948, because of an ulcer on the left ankle of two months' duration. The lesion was said to have begun at the site of a small bruise that had been received in a fall on a gravelled road. It had enlarged peripherally and had broken open in the center to form a superficial ulcer which became so painful that walking was difficult. There was no history of phlebitis or of any serious illness. Intermittent claudication had never been noted. The blood pressure was known to have been elevated for ten years.

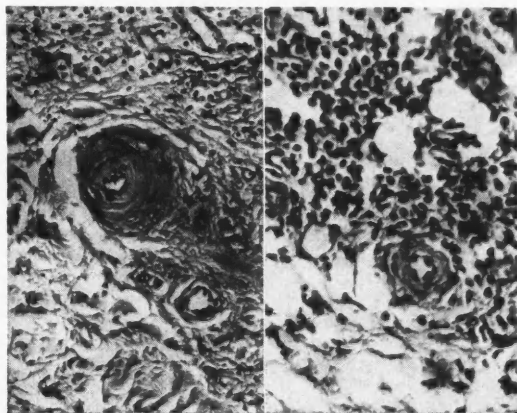


Figure 2.—(Left) Tissue from ulcer (Case 1). The media of the arteriole is hypertrophied and the lumen is narrowed. (Right) Tissue from ulcer (Case 1) showing a dense inflammatory reaction and a thickened arteriole in the mid-portion of the cutis.

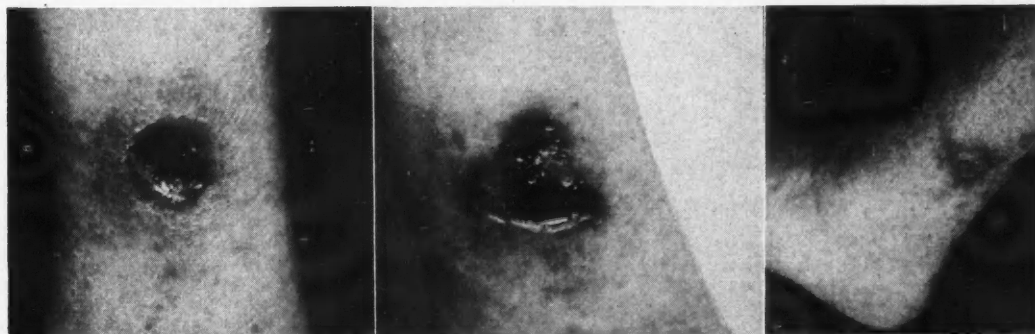


Figure 3.—(Left) Ischemic ulcer in the lateral surface of the leg (Case 2). (Center) Same ulcer two months later. (Right) Healed ulcer seven months after onset.



Figure 4.—Tissue from ulcer (Case 2) showing arterio-vascular changes and perivascular inflammatory reaction.

On physical examination, a superficial, sharply punched-out, soft-edged ulcer, 1.5 cm. in diameter, was noted above the left lateral malleolus. No cutaneous sclerosis was present and only a small amount of pigmentation was scattered around the ulcer. Slight pressure on the lesion resulted in severe pain. The greater saphenous veins were dilated bilaterally but were apparently competent. Palpation of the peripheral vessels revealed slightly diminished pulsations of the dorsalis pedis arteries. There was no pallor following elevation of the feet and no rubor following dependency. A roentgenogram of the lower extremities showed no evidence of calcification of the peripheral vessels.

The blood pressure was 250 mm. of mercury systolic and 140 mm. diastolic. Results of laboratory studies of the blood and urine were within normal limits, and serologic tests were negative for syphilis. A culture from the exudate yielded a small growth of *E. coli*. A biopsy specimen was taken from the margin of the ulcer.

The patient was confined to bed and during the next two months the ulcer gradually enlarged, almost doubling in diameter. Following continued applications of various antibiotics, the ulcer began to heal and the pain diminished. Approximately seven months after the ulcer first appeared, healing was complete.

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Discussion by N. E. FREEMAN, M.D., San Francisco

Dr. Farber's presentation serves further to emphasize the importance of hypertensive ischemic ulcers of the leg.

Ulcer of the leg is not a fatal disease, but it may be incapacitating; and the loss of time, of both patient and physician, represents a serious economic burden. The very fact that leg ulcers are so frequently encountered has militated against careful study of them.

I am not prepared to accept the term "hypertensive ischemic leg ulcers" as an etiological diagnosis, chiefly because I do not feel that hypertension itself is anything more than a sign or a symptom of an underlying cardiovascular condition. But possibly this is just quibbling. The advantage of appending a name to some clinical condition rests in the fact that cases which fit into a certain category can be set aside for more intensive study. The disadvantage, however, is that as soon as a condition has been given a name it is thought to be understood, and the physician's interest may be stultified in that he can say to himself, "Oh, yes, this is a hypertensive ischemic leg ulcer."

There is just one question I should like to ask: Why do these ulcers appear only in the lower extremities? The circulation of blood is dependent upon the establishment of a gradient of pressure from the arterial to the venous side of the capillary network. Manifestly, in these patients whom Dr. Farber has described there is evidence of structural impairment of arterial supply. However, I believe more careful search should be made for evidences of impairment of venous return. Even though the patients gave no history of thrombophlebitis, had no varicose veins, and had little or no edema, I do not believe that the question of impairment of venous return has been ruled out. Careful studies by phlebography have often demonstrated the presence of deep venous occlusion or incompetent valves of the communicating veins of the legs in patients who have given no history of thrombophlebitis. Bauer of Sweden has demonstrated by venography how often even mild trauma to the lower extremities results in venous thrombosis. This venous thrombosis may be entirely unrecognized, both by the patient and by the physician, and yet, years later, may be followed by post-thrombotic sequelae.

Another point of interest is the degree of vasoconstriction which may for years have preceded the development of these leg ulcers. It is well known that prolonged vasoconstriction, as in Raynaud's disease, ultimately will lead to organic arterial obliteration of the smaller blood vessels. The ulcers of the leg in patients with livedo reticularis demonstrate, on histological study, lesions involving both the arteries and veins not unlike those which Dr. Farber has described.

Some Aspects of the Management of Bilateral Calculus Disease of the Kidney

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SUMMARY

In the diagnosis of bilateral calculus disease of the kidneys, it is important to differentiate between cystine, uric acid, calcium oxalate and phosphate renal lithiasis. Methods for distinguishing one from another are described.

Dietary therapy is the method of choice for cystine and uric acid lithiasis.

In calcium and phosphate urolithiasis, dietary therapy is a very useful adjunct. It must be regulated by careful studies of its effect on urinary calcium precipitability, a new test for which is described based upon the demonstration of the existence of two forms of calcium in the urine.

Irrigation therapy for calcium phosphate and phosphate lithiasis is briefly discussed.

Surgical therapy for large renal phosphatic calculi is discussed to show how considerations of renal counterbalance and urinary calcium, magnesium and phosphate excretion through damaged kidney substances influence the surgical plan in each case.

THE management of patients with bilateral urinary calculi, or with a history of having had calculi coming from both kidneys, presents many difficult problems. Once the diagnosis has been made, several questions of treatment present themselves: When, if, and how to operate; when and if to use irrigation treatment; when and what type of general medical and dietary therapy to institute. The objective of all such treatment is to return the urinary tract to as near normal as possible and prevent recurrent stone formation. In order to attain this objective the presence or absence of hyperexcretion of the stone-forming crystalloids, the precipitability of these crystalloids, and the presence or absence of urinary stasis and infection must be ascertained and evaluated in each case.

In order to evaluate the question of hyperexcretion and precipitability of the stone-forming crystalloids in a particular case, it is first necessary to determine the chemical composition of the stones that are present. Table 1 illustrates the chemical composition of urinary calculi as described by

Prien and Frondel¹² in the crystallographic studies of urinary calculi. Although these studies are extremely important from a research point of view, from the practical point of view they thus far do not differ from the ordinary chemical classification such as described by McIntosh¹¹ and illustrated in Table 2. This classification divides urinary calculi into five types—the cystine, the uric acid, the calcium oxalate, the calcium phosphate, and the magnesium ammonium phosphate stones. Rare calculi such as the xanthine calculi and calculi associated with sulfonamide administration are not considered here. The determination of the chemical composition of the calculi in question is made by the clinical and x-ray features to be described later in this presentation, and by the actual chemical and physical properties of the stone when this is obtained by methods described elsewhere.

The most important factor in the pathogenesis of cystine lithiasis is hyperexcretion of the stone-forming crystalloids. Unless that defect of intermediary metabolism which is associated with an inability to complete the breakdown of cystine is present, hyperexcretion of this crystalloid in the urine does not occur and cystine calculi do not form. Therefore, it is possible to make a diagnosis

TABLE 1.—Crystalline Component of Urinary Calculi (Prién and Frondel)

Substance	Mineralogical Name
Calcium oxalate monohydrate	Whewellite
Calcium oxalate dihydrate	Wheddellite
Magnesium ammonium phosphate hexahydrate	Struvite
Carbon-apatite	Carbonate-apatite
Hydroxyl-apatite	Hydroxyl-apatite
Calcium hydrogen phosphate dihydrate	Brushite
Uric acid	
Cystine	
Sodium acid urate	
Tricalcium phosphate	Whetlockite

TABLE 2.—The Classification of Renal Calculi According to Chemical Pathogenesis

1. Uric acid
2. Cystine
3. Primary calcium stones without infection
 - { Oxalate
 - { Phosphatic
 - { Carbonic
4. Magnesium stones—urea splitting organisms.
 - P. Ammoniae *
 - P. Morgani
 - Staphylococcus
 - E. coli

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of cystine lithiasis by studying the urinary output of cystine. The normal amount in a 24-hour specimen of urine is 10 to 15 mg. In cases of cystine lithiasis this value may go up to 400 to 1,000 mg. per 24 hours. A test for cystine that can be done in the ordinary clinical laboratory is outlined in Table 3. Thus, if the amounts in the urine are very small, cystine stone cannot be present; if the amounts are large the probabilities are that the stone in question is a cystine stone.

TABLE 3.—*Technique for Testing for Cystine in Urine*

To 5 cc. urine made alkaline with ammonium hydroxide, 2 cc. of 5 per cent sodium cyanide solution is added and allowed to stand for from 5 to 10 minutes. A few drops of a freshly prepared 5 per cent sodium nitroprusside solution is then added. In the presence of cystine, a permanent deep purplish red color develops.

Cystine lithiasis presents other features which are quite characteristic; infection is usually absent, the urine is acid, the stones grow rather rapidly, and, therefore, when they finally become manifest are large and usually coraliform. They are moderately opaque to the x-ray, presenting a rather homogeneous appearance on the film. Grossly they appear crystalline and of a greenish-yellow color. If a diagnosis of cystine lithiasis is established, every effort should be made to avoid surgical treatment, since the defect in metabolism cannot be corrected and surgical removal, therefore, will only lead to recurrent stone formation unless meticulous medical management is instituted. Operation should not be done unless the stone is producing obstruction and infection to the urinary passageways which makes such treatment exigent. The medical management consists of placing the patient on an alkaline ash, low protein diet, and supplementing this diet with sodium bicarbonate in large enough doses to keep the urine persistently of a pH between 7.0 and 8.0. Infection and urinary stasis should be corrected, if at all possible. Such treatment when meticulously carried out will produce satisfactory results.

In contrast to cystine lithiasis, there are three important factors in the pathogenesis of uric acid stones. These are (1) hyperexcretion of the stone-forming crystalloid in patients who have a defect in uric acid metabolism, (2) a persistently acid urine, and (3) the presence of a nucleus upon which the uric acid stone may form. Without hyperexcretion of the uric acid, uric acid stone may still form if the other two factors are present. In some cases of gout, uric acid stone may form without hyperexcretion of uric acid in the urine. In order to rule out defective metabolism, studies of uric acid content in the blood are of importance. The normal value is between 3 and 4 mg. per 100 cc. of blood. In gout the uric acid content may run as high as 8 mg. per 100 cc.

Uric acid stones, in contrast to cystine stones, are non-opaque to the x-ray so that they are recognized

by a filling defect in the pyelogram and not by an opacity on the plain film. Moreover, as they grow very slowly and usually produce pain and hematuria in the early stages of formation, the attention of the patient as well as the physician is drawn to the urinary tract before the stones have become very large. Therefore, they frequently are first noted by the patient and the physician when they are passing down the ureter.

A coraliform stone built up from uric acid, although rare, can occur. Characteristically, then, uric acid lithiasis will present the following features: Clinical symptoms in the presence of a small stone which is non-opaque to the x-ray with an uninfected, highly acid urine. In many of these cases the uric acid content of the blood is high. Here, as in the case of cystine lithiasis, operation should be avoided. Usually the stone will pass spontaneously or with manipulation. Recurrent stone formation will be reduced tremendously by placing the patient on a low purine, alkaline ash diet supplemented by large enough doses of bicarbonate to keep the uric acid in solution and to keep the pH of the urine between 7.0 and 8.0. All factors which may produce a nucleus should be cleared up, if possible, since dissolution of fairly large stones has not been accomplished; in the author's experience those stones which have not passed spontaneously have to be removed by surgical means. However, it is to be emphasized that such operations are only incidental in the management of patients with stones of that kind.

If the stones do not fall into the uric acid and cystine group but are definitely in the oxalate or phosphatic group, the situation is different. Although hyperexcretion of the stone-forming crystalloids is not infrequent as a primary cause of these stones, persistent hyperexcretion of calcium is rare. The most important condition in which this occurs in association with renal calculi is hyperparathyroidism. If hyperparathyroidism is present, this can usually be determined definitely by blood chemical and urinary calcium studies (Table 4). If it is present, then the condition should be taken care of first before anything is done about the calculi (Figure 1). If the calculi have been formed due to other factors such as hyperexcretion during a period of recumbency, or infection and stasis, or causes which at present are not well understood, then the treatment becomes one of attention to those details which at present are thought to be connected with the formation of calculi of this type (Table 5).

Calcium oxalate stones when they occur alone do not usually form large coraliform stones. The urine is not usually infected and is usually neutral in pH. The stones are radiopaque and have a characteristic serrated appearance. The cause of such stones is not completely known. The treatment is removal. In many cases they will pass spontaneously because of their small size. The preventive treatment consists of forcing fluids, avoiding infection and stasis in the urinary tract, and dietary management.

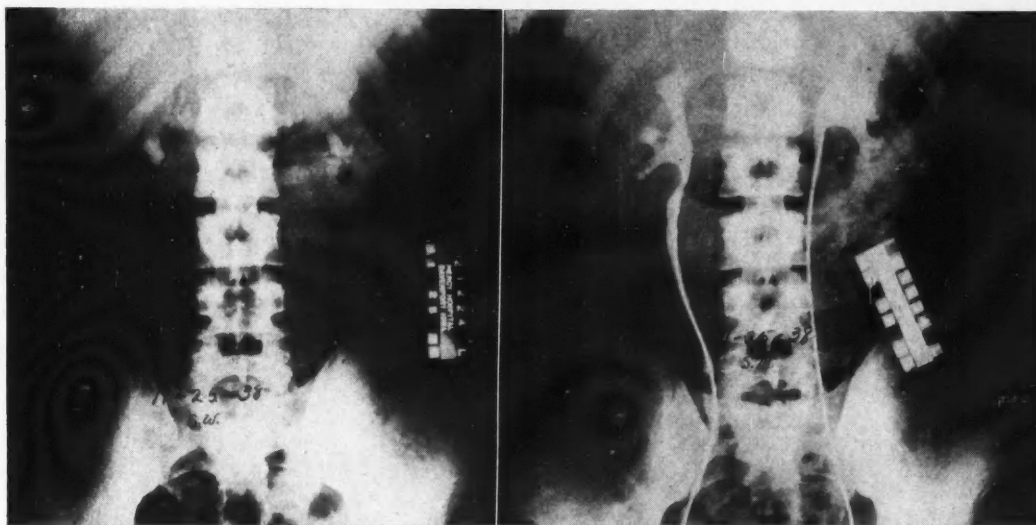


Figure 1.—Plain film and retrograde pyelograms in a patient who had absolutely no evidence of bone changes or bone symptoms and who consulted a physician simply because of pyuria. Examination showed the presence of bilateral renal calculi, blood calcium of 13.7 mg. per 100 cc., and blood phosphorus of 2.7 mg. per 100 cc. These are the typical blood findings in hyperparathyroidism. In addition the patient had a urinary calcium output of over 600 mg. per 24 hours. The parathyroid glands were explored and an adenoma found and removed. Following this, under general care for infection and on dietary therapy for phosphate calculi, the urinary calculi disappeared.

TABLE 4.—Urinary Calcium Excretion for Twenty-four Hours After Different Conditions

Condition	Urinary Calcium, mg.
1. Normal individual.....	200±
2. Body immobilization.....	350-450
3. Bone disease:	
First few days.....	Normal or high?
Early weeks.....	300-450
Late years.....	100-450
4. Pronounced renal damage.....	30-60
5. Endocrine disturbances:	
Hyperparathyroidism.....	350-550†
Hyperthyroidism.....	Normal* or high
Hyperpituitary function.....	Normal* or high
6. "Idiopathic" high urinary calcium; 50 to 66 per cent of patients with calcium stones. Not due to difference of absorption.....	300-500

* Leriche.

† The blood serum calcium in hyperparathyroidism before renal insufficiency occurs is elevated above 11 mg. per cent and the serum phosphorus is lowered below 3 mg. per cent. The phosphatase is high.

With regard to dietary management, the important work of Hammersten^{7, 8} of Sweden must be emphasized. She showed that the solubility of calcium oxalate is very definitely influenced by the presence of the magnesium ions (Table 6). For example, if a few cubic centimeters of the Sulkowitch reagent* is added to a specimen of urine to precipitate the calcium as calcium oxalate, a heavy cloud of precipitate occurs if there is a fair amount of

* Sulkowitch reagent: Ammonium oxalate, 2.5 gm.; oxalic acid, 2.5 gm.; glacial acetic acid, 5 cc.; distilled water q.s., 250 cc.

TABLE 5.—Conditions Predisposing to Calcium Urolithiasis

1. Disease producing prolonged immobilization of the body
 - a. Fractures of the spine or extremities associated with prolonged immobilization of large bones.
 - b. Chronic osteomyelitis.
 - c. Chronic arthritis, or other bone joint disease, producing immobilization of large portions of the skeleton.
 - d. Neurologic damage as a result of trauma or disease producing prolonged immobilization.
 - e. Chronic visceral disease requiring prolonged recumbency.
2. Changes in the urinary organs
 - a. Congenital anomalies associated with stasis.
 - b. Acquired obstructions—stricture of urethra, etc.
 - c. Paralysis of urinary passageway.
 - d. Introduction of infection into urinary tract.
 - e. Foreign body in urinary passageway.
3. Endocrinopathies
 - a. Hyperparathyroidism
 - b. Hyperthyroidism?*
 - c. Hyperpituitary disease?*
4. Focus of infection elsewhere in body?*
5. Vitamin deficiency or excess
 - a. Vitamin A deficiency?*
 - b. Vitamin D excess
6. Metabolic abnormalities
 - a. Idiopathic hypercalcinuria
 - b. Changes in colloids?*

* Note: Conditions with question mark are included mainly upon a theoretical basis. Others are included upon a clinical basis.

calcium in the urine. If, on the other hand, a few cubic centimeters of magnesium sulfate is added to the urine prior to the addition of the Sulkowitch reagent, no precipitate or a much more slowly forming and less dense precipitate occurs, the variation depending upon the original concentration of the calcium and the amount of magnesium sulfate

which has been added. Moreover, Hammersten showed that a quantitatively and qualitatively adequate diet with a good supply of calcium, magnesium, and phosphorus in well-balanced proportions and in easily resorbable form, does not give rise to calculi in the urinary passageways of rats. After producing urinary stones, which were either calcium oxalate or calcium phosphate stone, by means of an inadequate diet (a diet which contained inadequate amounts of magnesium and excesses of oxalic acid), Hammersten gave the fully adequate diet for therapeutic purposes. Of 64 stones which were demonstrated radiologically in the experimental animals, 40 per cent decalcified. This emphasized the importance of a diet adequate in magnesium, calcium, and phosphorus in preventing the formation of oxalate calculi. Hammersten showed that in animals given inadequate amounts of both calcium and magnesium, the urinary calcium became elevated and it was apparently upon this basis that the stones formed. It may very well be, therefore, that lack of adequate magnesium intake might explain hypercalcinuria in cases in which the disease cannot be ascribed to recumbency or definite abnormality of the calcium metabolism. It has also been indicated (Burkland³) that a diet low in oxalates and high in vitamin B complex is

of importance in decreasing available oxalate in cases of oxalate calculi. Diets adequate in calcium and magnesium and other vitamins and low in oxalate may be worked out on the basis of information given in Table 7.

With regard to the dietary management for the prevention of the recurrence of both oxalate and calcium phosphate stones, studies of the precipitability of the urinary calcium are of importance, for only by such means can one gain information with regard to the efficacy of the regimen prescribed for the patient. Studies by the author^{4, 5, 6} along these lines have previously been reported. (See Figure 2 and Table 8.) Further studies now in progress and the work of Shorr,¹³ Scott, and others would seem to indicate that one of the ways that nature has for maintaining the calcium salts in solution in the urine is not only the neutral salt effect but the formation of some sort of complex ion leaving only a proportion of the calcium in the free ionized state. It is the latter which is free to form the insoluble oxalate and phosphate salts and precipitate as illustrated in Figure 3. That urine contains calcium in two such forms—one the ionized on the positive side, and the other the non-ionized or in the form of a complex anion—has been demonstrated in the laboratory at the University of Iowa College of Medicine by experiments of two types: (1) elec-

TABLE 6.—Solubility of the Different Forms of Calcium Oxalate in Water and in Urine with Magnesium (Hammersten):

	Mono-hydrate	Di-hydrate	Tri-hydrate
Water 37°.....	3x10 ⁻⁹	9x10 ⁻⁹	27x10 ⁻⁹
Urine saline solution with magnesium content of 0.01 mol. 37°.....	196x10 ⁻⁹	600x10 ⁻⁹	1,800x10 ⁻⁹

TABLE 7.—Diet for Patients with Oxalate Stone

Omit: Cocoa; chocolate; pepper and other spices; spinach; chicory; string beans; green beans; beets; potatoes; gooseberries; rhubarb.

Use: Fruits: apples, apricots, peaches, pears, melons.

Vegetables: carrots, celery, peas, turnips, asparagus, lettuce, cabbage, cauliflower, cucumbers.

Use white bread.



Figure 2.—Calcium precipitability. Concentration of calcium in B minus concentration of calcium in A equals calcium precipitability. Method: 100 cc. of freshly voided urine is obtained, and immediately divided into two portions after the pH has been determined. In one the concentration of calcium is obtained. The other is immediately thoroughly mixed with 1 gm. of finely divided calcium phosphate for 10 minutes and filtered, and then the calcium concentration is obtained. The two concentrations are then compared. The urinary calcium precipitability as determined by this method is then expressed as minus the milligrams of calcium which will precipitate from the urine when it is mixed with calcium phosphate as just described. By this definition, a minus value indicates that calcium will precipitate from the urine under these conditions and a positive value indicates that calcium phosphate will dissolve in the urine under these conditions.

TABLE 8.—Urinary Calcium Precipitability with Regard to Calcium Phosphate in a 19-Year-Old White Male

Condition of Activity	Diet	Daily Urinary Calcium Excretion, mg.	pH of Urine	Concentration of Calcium, mg. %	Concentration after Ten Minutes Mixing Calcium Phosphate, mg. %	Precipitability
Normal.....	High calcium	380	6.0	39	29	-10
Immobilized 7 days.....	High calcium	690	6.0	42	8	-34
6 days after immobilization.....	High calcium	450	5.5	27	21	-6
Normal.....	Low calcium	170	6.0	21	17	-4
Normal.....	Basic ash	284	6.0	14	10	-4

Note the influence of immobilization both upon the 24-hour urinary calcium and upon the precipitability; the latter is tremendously increased. Note that when activity is normal, precipitability is within normal limits, irrespective of diet or pH of urine when the latter does not vary within wide limits.

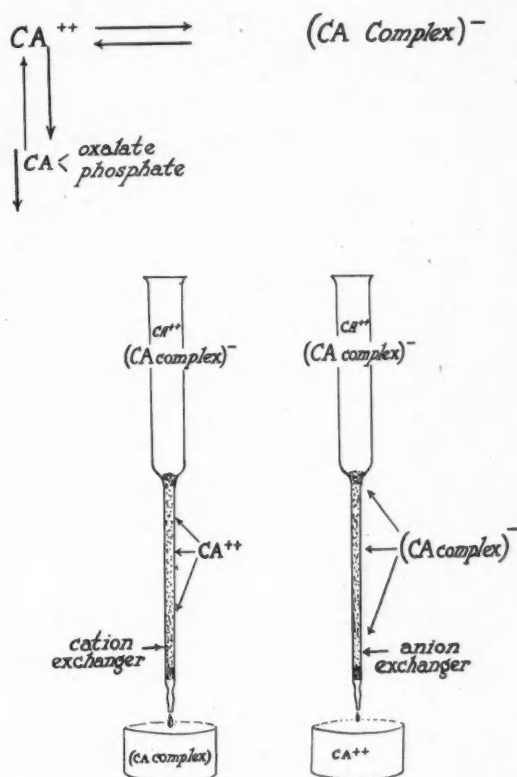


Figure 3.—Ion exchangers being used for the determination of the different types of calcium in urine. The theoretical chemical situation involved is illustrated also.

trololysis; and (2) experiments with adsorbing resins. By means of the latter, quantitative estimates of each form of calcium in a given specimen of urine can be made. For example, if a solution of calcium chloride which contains 20 mg. of calcium per 100 cc. should be subjected to a cation resin exchanger for 15 minutes, it would be found that the calcium had been completely removed from the solution. If the solution then were tested with the Sulkowitch^{1,2} reagent, no precipitate of calcium oxalate would occur. On the other hand, if urine in which the calcium precipitability is low were subjected to the same procedure, a very definite precipitate of calcium oxalate would occur upon the addition of the oxalate reagent. The reason for this is that the solubility of the calcium oxalate is so low that it will pick up calcium ion in very low concentration and thus reverse the equilibrium between the calcium ion and the calcium complex in the urine—something which the ion exchanger (adsorbing resin) cannot do as easily. An estimate of the percentage of calcium in the free ionized state in the urine may be obtained by noting the difference between the amount of precipitate before and after the urine has been subjected to the action of the cation exchanger. From this the quantity or concentration of calcium ion available for precipitation may be esti-

mated. Similarly, by the use of an anion adsorbing resin the amount of calcium tied up as a negative complex can be estimated. Assuming, then, that that portion of the calcium in the urine which is in the ionized state is the portion which is available for precipitation to form a stone or precipitate upon a stone, the test outlined can be used clinically to aid in estimating the efficacy of any regimen which we may prescribe to prevent the recurrence of calcium stones in any particular case. Such urinary calcium studies, under many different conditions, are now in progress in the laboratory of the University of Iowa College of Medicine.

Small calcium phosphate stones present essentially the same problems as do calcium oxalate stones. However, it is much easier to induce breakdown and passage of small calcium phosphate stones by means of general medical management than it is to achieve the same result with regard to calcium oxalate stones. This is because the creating of an acid urine of low calcium precipitability in cases in which there is no infection will have a much greater effect upon a stone formed from calcium phosphate than it will upon a calcium oxalate calculus. Calcium phosphate stones can usually be differentiated from oxalate stones by x-ray characteristics: The former are not serrated and the opacity is denser and more homogeneous.

In dealing with large phosphatic calculi, there are three types of therapy, any one or combination of which may be appropriate in the individual patient. These are (1) dietary regimen;⁹ (2) irrigation therapy¹⁴ and (3) surgical therapy.

Prerequisite to the use of dietary treatment is control of infection. Large doses of penicillin (at times 100,000 units intramuscularly every two hours for five days) should be used first, and if this is unsuccessful other drugs such as sulfacetamide, sulfadiazine, streptomycin, etc., may be necessary. The Higgins acid ash diet supplemented with vitamin A is the dietary regimen of choice. (Regular and frequent determination of the pH and calcium precipitability of the urine is extremely important in order to make certain that the regimen is having the desired effect upon the urine.) This type of therapy is indicated in cases in which the stones have the characteristics of early calcium urolithiasis, in which infection is absent or can be controlled, in which there are general contraindications to surgical treatment, and as an adjunct to other types of therapy for the prevention of recurrence.

Irrigation therapy through a urethral catheter with either Suby's solution or a similar solution* may also be used for patients with early calcium urolithiasis. The danger is introduction of infection. In those rare cases in which the stone is almost "sand-like" in character, very good results can be

* Irrigating solution: Citric acid (monohydrous), 32.3 gm.; magnesium oxide (anhydrous), 3.8 gm.; sodium carbonate (anhydrous), 4.4 gm.; distilled water q.s., 1,000 cc. If the solution has an irritating effect, this may be diminished by changing the ratio of acid to sodium carbonate to raise the pH.

obtained by this method. The most frequent use of irrigation therapy, however, is an adjunct to surgical removal of large coraliform or multiple calculi. In cases in which fragments or small stones have been left behind in the renal pelvis or severe infection is present, postoperative intermittent or continuous irrigation of the renal pelvis through a nephrostomy tube in conjunction with intensive anti-infection therapy and a diet to create a urine of low calcium precipitability produces excellent results. The forcing of fluids with the creating of a 24-hour urinary output of at least 2,500 cc. is really a form of irrigation treatment and is essential in all medical management of renal lithiasis. By this means small precipitates are washed out and cannot become nuclei for further stone formation. Moreover, the medium surrounding a stone is kept as free as possible of stone-forming crystalloid.

Operation is indicated in the treatment of patients with large phosphatic calculi if infection is present and it appears that complete removal of the stone, or stones, is possible either by operation alone or by operation in combination with irrigation through a nephrostomy tube. Great multiplicity of calculi or involvement of the renal pyramids contraindicates surgical treatment. If operation is done, it should be directed not only at the removal of the stone but also at the correction of stasis of any portion of the urinary passageway. This is absolutely necessary if recurrence of calculi is to be avoided.

In this connection, attention may be called to studies on urinary calcium and magnesium excretion from damaged kidneys⁴ (see Figure 4). These studies indicated that if an entire kidney is uni-

formly damaged, the urinary calcium and magnesium and urinary phosphate are so decreased that, unless pronounced stasis and infection are present, the chances of a new stone's forming are very slight. On the other hand, if only one calyx or one small group of calices are damaged, stasis and infection plus the entrance of normal urinary calcium and phosphorus from that portion of the kidney which is normal into the damaged portion of the kidney pelvis would predispose to recurrence of stone formation. This—in addition to the predisposition to infection—is the reason for calicectomy in such cases (See Figure 5).

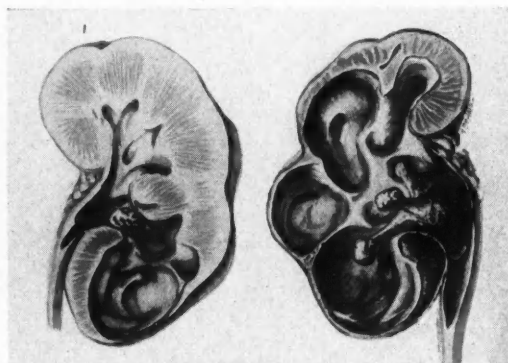


Figure 5.—Diagrammatic drawings of kidney pelvis and kidney substance to show how a kidney symmetrically damaged, as in the drawing at left, would excrete little calcium and phosphorus and, therefore, be less prone to form a recurrent stone than the one as illustrated in the drawing at the right, where, since most of the kidney substance is normal, there is plenty of the stone-forming crystalloid by stasis in the involved calyx predisposing to infection and precipitation in that area. Calicectomy should be done in such an instance.

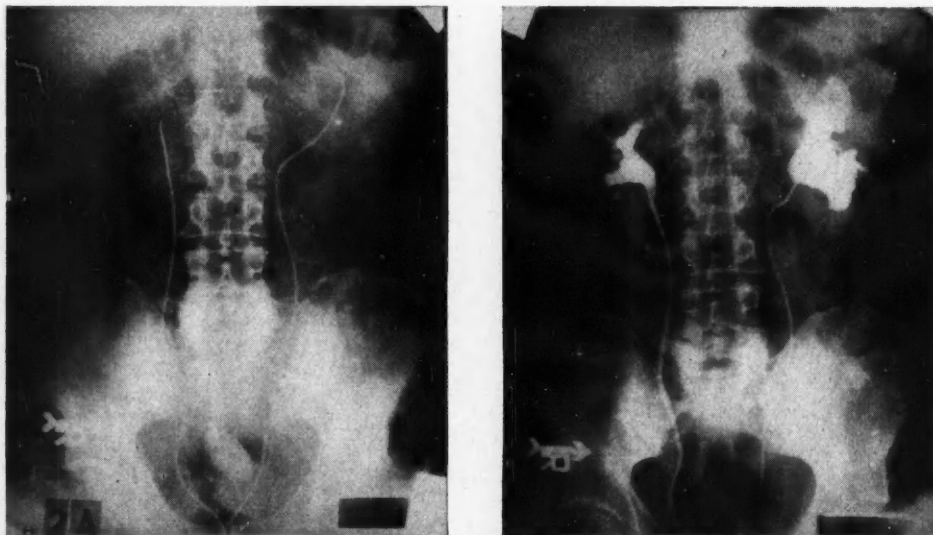


Figure 4.—The plain film and retrograde pyelogram of a patient who had hydronephrosis on the left side with very poor function of the left kidney. Differential studies of calcium magnesium and phosphorus were made. These showed, on the right side, 13.8, 12.3, and 40.0 milligrams per cent; on the left, 3.0, 12.5, and 1.5 milligrams per cent respectively. This illustrates the effect of damaged renal substance upon the excretion of calcium and phosphorus.

It is also necessary, when operation for removal of bilateral and unilateral coral calculi is being planned, to consider the influence of renal counterbalance. When one kidney is normal and there is no metabolic condition which might predispose to recurrent stone, it is more satisfactory to do a nephrectomy for coral calculus than to remove the stone itself. This is because, according to the theory of renal counterbalance (which has been frequently confirmed in the author's experience) even though the stone is completely removed and no recurrent stone forms, there will be progressive atrophy of the kidney. On the other hand, if the alternate kidney is damaged also, the kidney operated upon improves following the removal of the stone; but the danger of recurrent calculus is much greater, because as the kidney function improves the calcium and phosphate excretion through that kidney improves, so that the quantity of crystalloids becomes high enough to produce stone if other factors are favorable. In such cases it is extremely important to eliminate infection by the use of antibiotics and appropriate sulfonamides and to eliminate stasis by whatever surgical or medical procedure is necessary. It is preferable also in the case of bilateral renal calculi, when conservative procedures are planned and nephrectomy cannot be considered, to operate upon the poorer side first. If the better side is operated upon first, that kidney will come back to practically normal and nephrectomy then may be necessary on the other side, since the function on the bad side may not return because of the counterbalance effect.

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The Excretion of Digitoxin

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SUMMARY

By noting the reaction of embryonic duck hearts to solutions containing digitoxin, it is possible to detect as little as 2 micrograms of digitoxin in 24-hour urine samples of rats and of human subjects.

Rats were given large doses of digitoxin intraperitoneally and their 24-hour urine production collected. A minimal quantity of digitoxin was detected in the urine. A minimal quantity of digitoxin was detected in the first three 24-hour urine samples of human subjects given 1.2 mg. of digitoxin. These results show that by this method the measurable urinary excretion of digitoxin in the rat and in human subjects is small.

EXACT quantitative information concerning the absorption and excretion (or destruction) of digitalis glycosides in the human body is still to be obtained. Primarily this is because there is as yet no test sufficiently sensitive to detect the relatively minute amounts of digitalis glycoside which must be present in the tissues and body fluids of patients receiving digitalis.

In previous studies^{1,2,3} extremely minute amounts of the digitalis glycosides Lanatoside C and digitoxin were detected in Tyrode's solution, rat serum, and human serum. Moreover, it was possible to measure the rate of disappearance of the digitalis glycoside (Lanatoside C) from the bloodstream of man after intravenous injection.

Prior to these studies it had not been possible to measure in any quantitative fashion the actual renal excretion of digitalis glycosides, although it has been stated for many years on the basis of work by Hatcher and Eggleston⁴ in 1912 and 1919 that only a small fraction of any cardiac glycoside is excreted in the urine.

By means of the embryonic duck heart method it has been possible to measure, in a quantitative fashion, minute amounts of digitoxin in the 24-hour urine volumes of rats and of human subjects.

EMBRYONIC DUCK HEART METHOD

Briefly, the method used to set up the embryonic duck heart preparation consists of incubating fer-

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tile duck eggs at 39° C. for approximately 88 hours. The embryo, after it is removed in toto from within the vascular sinus in the egg, is suspended in Tyrode's solution on a slide and placed under a dissecting microscope. With the aid of cataract knives, the heart is teased free from the remainder of the fetal body. When six such hearts are thus dissected they are transferred, by floating them gently upon a small spatula, to a second slide well. This slide contains 0.5 ml. of the solution to be tested and rests on the stage of a compound microscope which is contained in a box automatically maintained at 35° C. After this final transfer the hearts are ready to be observed.

This particular biologic preparation reacts to the presence of sufficient digitoxin by the exhibition of increased rate of beating, hypertonic contractility, auriculoventricular block, missed beats, or finally, cessation of beating. The time of appearance of arrhythmia, usually manifested as auriculoventricular block or missed beats, is quantitatively commensurate with the concentration of digitoxin present.

As is shown in Table 1 the embryonic heart preparation reacted to the presence of 0.005 micrograms of digitoxin in 1 ml. of Tyrode's solution, whereas only quantities of 0.2 micrograms or more of digitoxin per ml. could be detected in rat serum and only quantities of 0.6 micrograms or more of digitoxin per ml. could be detected in human serum.

DETECTION OF DIGITOXIN IN URINE

The same method was applied for the detection of digitoxin in extracts of urine samples both of the rats and of human subjects. Because of the toxicity of urine as such, the problem of removing digitoxin alone without various toxic factors of urine from these samples was considerable.

TABLE 1.—The Detection of Digitoxin in (1) Tyrode's Solution, (2) Rat Serum, and (3) Human Serum by the Embryonic Duck Heart Preparation.

Concentration of Digitoxin (Micrograms per cc.)	AVERAGE TIME "DIGITALIS EFFECT" (MINUTES)		
	Tyrode's Solution	Rat Serum	Human Serum
.001.....	ND*	ND*	ND*
.005.....	48	ND	ND
.010.....	41	ND	ND
.05.....	23	ND	ND
.10.....	12	ND	ND
.20.....	—	62	ND
.40.....	—	38	ND
.60.....	6	24	49
.80.....	—	21	34
1.00.....	4	11	21

* ND indicates that no glycoside could be detected by occurrence of "digitalis effect" in embryonic heart preparation.

The volume that must be dealt with in testing human urine as compared to rat urine necessitates the employment of slightly different methods.

EXTRACTION FROM RAT URINE

The method of extraction of digitoxin from rat urine consists essentially of evaporation of the urine sample to dryness, extraction with chloroform, and evaporation of the latter. The chloroform residue is extracted with alcohol which in turn is added to water and the solution is then repeatedly boiled to rid it of alcohol. The final aqueous solution boiled down to 1 ml. is then diluted with 59 ml. of Tyrode's solution to make a final solution of 60 ml. This relatively large quantity is used to eliminate the effect on the duck hearts of certain toxic factors of urine which, although they cannot be wholly eliminated, can be diluted. This dilution factor must be taken into account when comparing the figures obtained in standardization of the effect of digitoxin in urine and in Tyrode's solution.

PROCEDURE

Embryonic duck hearts were exposed to this latter solution and the time of "digitalis effect" (i.e., auriculoventricular block or missed beats) observed and the quantity of digitoxin estimated according to previously described methods.^{2,3} It was thus found possible to detect as well as measure as little as 2 micrograms of digitoxin added to the 24-hour urine samples of rats. A quantitative differentiation could be made between urine samples containing different quantities of added digitoxin (Table 2).

Nine albino rats (average weight 165 gm.) were given 0.1 microgram of digitoxin per gm. of body weight by intraperitoneal injection, and their urine was collected for 24 hours. The urine samples of five of these rats were also collected on the second and third day following injection. Ten rats (average weight 218 gm.) were given 1.0 microgram of digitoxin per gm. of body weight by intraperitoneal injection and similar urine collections were made during the first 24 hours. Urine collections of eight of these rats also were made on the second and third days following injection. All urine samples were extracted and tested on the duck hearts by the method described.

RESULTS

The injection of a moderately large amount of digitoxin (i.e., 0.1 microgram per gram) as shown in Table 3, into ten rats was not followed by the appearance of detectable digitoxin in the 24-hour samples of urine of any of the rats either 24, 48, or 72 hours after injection. In view of the fact that each rat actually received approximately 16.5 micrograms of digitoxin, absence of as much as 1 microgram of digitoxin in the urine indicated that little or no free digitoxin as measured by this method was excreted by the kidneys of these rats.

However, the urine samples (shown in Table 4) collected during the first 24 hours from the ten rats that had received ten times the above amount of digitoxin (i.e., 1.0 microgram per gram) contained an average of 7.4 micrograms of digitoxin (range: 3.3 to 10 micrograms). However, none of the urine samples collected during the second and third days after injection contained a detectable amount of digitoxin (i.e., less than 1 microgram).

Thus, even in these rats which had received a relatively large amount of digitoxin (average 218 micrograms) the average renal excretion of free digitoxin, as measured by this method, of only 7.4 micrograms (less than 3.5 per cent of the administered dose) again indicates that the renal excretion of digitoxin in the rat, measurable by this method, is small.

EXTRACTION FROM HUMAN URINE

The method of extraction of digitoxin from human urine is somewhat shorter than that used for extraction from rat urine. The urine is evaporated to dryness, the digitoxin extracted with chloroform, and the solution then evaporated and dried in vacuo. The chloroform residue is extracted with alcohol and the solution again dried. Chloroform is again used for extraction and is then evaporated in vacuo. The final residue is added to 50 ml. of Tyrode's solution to make a final solution of 50 ml. Again, as with the rat urine extracts, this dilution is made in order to eliminate the toxic factors of urine which have not been eliminated in the extraction until dilution is made.

TABLE 2.—The Quantitative Detection of Digitoxin in (a) Tyrode's Solution, (b) Rat Urine, and (c) Human Urine

TYRODE'S		RAT URINE		HUMAN URINE	
Concentration of Digitoxin (Micrograms per ml.)	Average Time "Digitalis Effect" (Minutes)	Micrograms added to 10 cc. volume	Average Time "Digitalis Effect" (Minutes) Sample Diluted 1/60	Micrograms added to 200 cc. volume	Average Time "Digitalis Effect" (Minutes) Sample Diluted 1/50
.001	over 60	1	ND*	1	ND*
.005	45	2	32	2	48
.01	41	4	19½	3	35
.05	23	6	16	4	26
.1	12	8	12	6	22
.5	6	10	8	8	17
1.0	4			12	11
				16	8

* ND—same as in Table 1.

TABLE 3.—Excretion of Digitoxin in the Rat After Intraperitoneal Injection of Digitoxin (0.1 Microgram per Gm.)

Rat	Weight (Gm.)	Urine Volume (ML.)	1st 24 HOURS		2nd 24 HOURS 2 MICROGRAMS ADDED TO SAMPLE		
			Average Time "Digitalis Effect" (Minutes)	Amt. Digitoxin Excreted (Micrograms)	Urine Volume (ML.)	Average Time "Digitalis Effect" (Minutes)	Amt. Digitoxin Excreted (Micrograms)
			Sample Diluted 1/60			Sample Diluted 1/60	
1	145	20	over 60	ND*	36	39	ND*
2	170	10	over 60	ND	10	36	ND
3	160	8	over 60	ND	9	40	ND
4	155	15	over 60	ND	5	31	ND
5	170	10	over 60	ND	20	28	ND
6	175	14.5	over 60	ND			
7	165	7	over 60	ND			
8	176	9	over 60	ND			
9	169	22	over 60	ND			

* ND indicates no digitoxin could be detected (i.e., less than 1 microgram.)

TABLE 4.—Excretion of Digitoxin in the Rat After Intraperitoneal Injection of Digitoxin (1.0) Micrograms per Gm.)

Rat	Weight (Gm.)	1st 24 HOURS	
		Urine Volume (ML.)	Amount Digitoxin Excreted (Microgram)
1	215	16.0	6.40
2	210	25.0	10.00
3	241	16.0	9.60
4	180	8.0	3.30
5	230	11.0	7.00
6	250	28.0	8.00
7	230	8.0	7.00
8	220	46.0	9.00
9	210	17.0	6.00
10	250	38.0	8.00

PROCEDURE

Embryonic duck hearts were exposed to this latter solution as with the rat urine extracts, and the time of "digitalis effect" observed.

Approximately 50 per cent loss of digitoxin occurred in the extraction of human urine samples if quantities below 12 micrograms were used. This loss, however, at any given concentration of digitoxin in an original volume of 200 ml. of human urine, was relatively constant. Therefore, standards were made consisting of extracts of known amounts of digitoxin added to 200 ml. quantities of human urine. Table 2 shows the different times of "digitalis effect" at any given concentration. Again it is important, in comparing this with the standard results in Tyrode's solution, to take into account the dilution factor of 1/50 (Table 6).

The urinary excretion of digitoxin of seven patients was tested by this method and recorded in Table 5. Each of these patients, five females and two males, with an average age of 65 years, and an average weight of 151 pounds, was given a total of 1.2 mg. (1,200 micrograms) of digitoxin in divided doses over a six-hour period, and urine collected from the time of the initial dose. It will be noted that four of these patients had hypertension, two had coronary artery disease, and one was psychoneurotic and had no organic disease. Only two patients showed evidence of cardiac failure.

In the first 24 hours the urinary excretion of digitoxin as measured by this method in these patients was found to range from less than 5 micrograms to 62 micrograms,* giving an average percentage excretion of 2.2 per cent with a range from less than 0.4 per cent to 5.2 per cent.

In the second 24 hours the urinary excretion of digitoxin was found to range from less than 3 micrograms to 25 micrograms, or a percentage range of from less than 0.2 per cent to 2.1 per cent.

The urine of only two patients so far has been tested in the third 24-hour period and the digitoxin excreted was 8.7 and 12.0 micrograms respectively, or a percentage of 0.7 per cent and 1.0 per cent respectively.

DISCUSSION

It will be noted that as the data obtained were on elderly subjects, diminution of renal function may have been a factor; but since the rate of glomerular filtration in such subjects probably would not be reduced more than 30 per cent, the amount of digitoxin excreted theoretically by a healthy, youthful kidney would still be relatively small.

In view of the fact that it is generally considered that complete absorption of digitoxin occurs after oral administration, failure to find a major portion of it in the urine suggests that the role of the human kidney in the excretion of digitoxin may be secondary to that of some other organ or organs.

On the basis of studies now being carried out, it can be said that such results do not necessarily apply to patients on maintenance doses of digitoxin.

There are, of course, several possible explanations for this moderate renal excretion of digitoxin. Hatcher and Eggleston in their work in 1919⁴ concluded, from their much less accurate quantitative measurement, that digitoxin is largely destroyed in the body, that part of it is fixed in the liver, and that only traces of it appear in the urine and feces.

Another strong possibility is that digitoxin may be adsorbed so strongly to serum protein that ex-

* Micrograms of digitoxin determined in 200 ml. sample, compared to standards and the total 24-hour output of digitoxin figured on the basis of the total 24-hour urinary output.

TABLE 5.—Excretion of Digitoxin in Human Subjects (Oral Ingestion of 1.2 Mg. Over 4-Hour Period)

Case	Weight (lbs.)	Age	Sex	Diag.*	Congestive Failure	FIRST 24 HOURS (Digitoxin Excreted)			SECOND 24 HOURS (Digitoxin Excreted)			THIRD 24 HOURS (Digitoxin Excreted)		
						Urine (ML.)	Micrograms	%	Urine (ML.)	Micrograms	%	Urine (ML.)	Micrograms	%
1	150	54	F	Hyp.	No	770	22.0	1.8						
2	130	69	M	Hyp.	No	1000	30.0	2.5						
3	175	69	M	Cor.	Yes	1120	<5	—	1450	14.5	1.2	870	8.7	0.7
4	130	68	F	Cor.	No	580	5.8	0.5	850	25.0	2.1			
5	120	67	F	Hyp.	Yes	510	10.0	0.8	650	<3.0	—			
6	140	66	F	N.D.	No	2050	62.0	5.2	810	12.0	1.0			
7	210	64	F	Hyp.	No	2496	25.0	2.1	2150	<10.0	—	1160	12.0	1.0

* Hyp.—Hypertension. Cor.—Coronary Artery Disease. N.D.—No disease.

cretion is minimal. This adsorption of digitoxin has been in striking contrast to the lack of adsorption of the digitalis glycoside Lanatoside C, as demonstrated in a previous paper.² There is probably also similar fixation to other proteins in the tissues of the body.

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TABLE 6.—Comparison Between Tyrode's Solution and Urines in Regard to Time of "Digitalis Effect"

	Time of "Digitalis Effect" for Urine Sample Diluted 1/60 (Minutes)	Actual Quantity of Digitoxin Added to Original Urine (Micrograms)	Actual Quantity of Digitoxin per Ml. in Final Solution if all Extracted (Micrograms)	Time of "Digitalis Effect" in Tyrode's Solution Expected with Digitoxin Concentration per Ml. as in Col. III (Minutes)
Rat Urine	ND*	1.00	.016	37
	32	2.00	.033	28
	19½	4.00	.066	17½
	16	6.00	.100	12
	12	8.00	.130	11
Human Urine	8	10.00	.160	10½
	ND	1.00	.02	35
	48	2.00	.04	26
	35	3.00	.06	19
	26	4.00	.08	15
Human Urine	22	6.00	.12	11½
	17	8.00	.16	10½
	11	12.00	.24	9
	8	16.00	.32	8

* ND indicates that no glycoside could be detected by occurrence of "digitalis effect" in embryonic heart preparation.

The Syndrome of Proximal Jejunal Loop Obstruction Following Anterior Gastric Resection

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SUMMARY

An occasional complication following subtotal gastric resection of the antiperistaltic, antecolic type is closed loop obstruction high in the intestine. Unless recognized and treated early, it causes death rather quickly. Prompt surgical intervention is life-saving.

Symptoms which characterize the complication and distinguish it from other forms of high intestinal obstruction or stomal edema are (1) unrelenting epigastric or left upper quadrant pain and tenderness attended by clinical indication of shock, and (2) rather limited vomiting with absence of bile and small bowel contents in the vomitus.

Five cases occurred in a series of some 500 anterior long loop anastomoses. In three cases the complication was not immediately recognized and the patients died. In the other two cases, recovery followed surgical intervention.

THE purpose of this presentation is to discuss briefly a mechanical complication of subtotal gastric resection which, if unrecognized and untreated, results promptly in fatal obstruction high in the intestine. The mechanism is entirely different from the usual difficulties encountered due to edema or slight kinking in the region of the stoma, difficulties which usually subside under conservative decompression therapy. It is a complication which occurs only if the operation combines two procedures, namely (1) antecolic anastomosis between stomach and jejunum, and (b) anastomosis in which the proximal limb of the jejunal loop is placed at the lesser curvature of the gastric stoma.

There are, of course, two methods of attaching jejunum to stomach in regard to gastrointestinal flow. The jejunum may be attached to the stomach so that the proximal limb is at the lesser curvature (Figure 1) or at the greater curvature (Figure 2). Opinion is divided on the efficiency of these two methods, and is not conclusive one way or the other. Most surgeons agree that the jejunal loop should be brought up and attached to the stomach

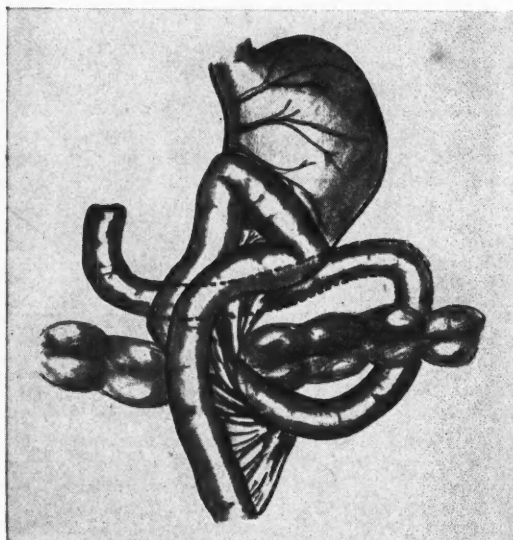


Figure 1.—Antecolic, antiperistaltic anastomosis between jejunum and stomach. The proximal jejunal limb is at the lesser curvature of the stomach.

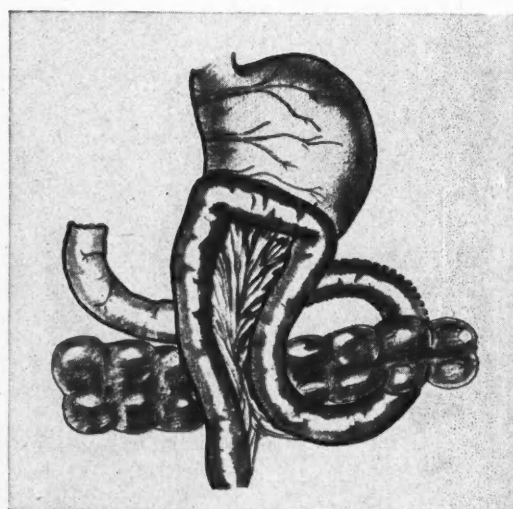


Figure 2.—Antecolic, isoperistaltic anastomosis between stomach and jejunum. The proximal jejunal limb is at the greater curvature of the stomach.

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so that it lies in the easiest and most natural manner, regardless of whether it is placed in an isoperistaltic or antiperistaltic direction.

This point, however, appears to deserve much more careful consideration. It should be remembered that the root of the small bowel mesentery most commonly follows an oblique line beginning at the ligament of Treitz, just to the left of the second lumbar vertebra, ending opposite the right sacro-iliac joint in the right lower quadrant of the abdomen. When the jejunum is attached to the stomach so that the distal loop is at the greater curvature, the mesentery of the distal loop necessarily becomes twisted approximately 135° from this oblique line. While this may be somewhat difficult to visualize or describe, anyone can prove this point to his own satisfaction very readily in the morgue. Although mesenteric torsion apparently does not interfere with the blood supply of its own loop, it does shorten the mesentery so that pressure is occasionally exerted upon the proximal loop as the proximal loop passes between the shortened mesentery and the transverse colon (Figure 3). The pressure of the mesentery of the distal loop on the proximal loop may cause a complete intestinal obstruction of the closed loop type, a condition which, if unrecognized, is invariably rather promptly fatal. The picture is a dramatic one and, while infrequent (five cases in approximately 500 resections), it has certain characteristic features which should make its recognition possible to the experienced surgeon. It is particularly important to differentiate this kind of closed proximal loop obstruction, which requires prompt surgical intervention to insure against a fatality, from edema of the stoma, which will usually respond to conservative therapy.

CASE REPORTS

The following five cases are briefly presented to illustrate this particular mechanical complication.

CASE 1: The patient was a 51-year-old female with clinical and x-ray evidence typical of carcinoma of the pyloric portion of the stomach. At operation carcinoma involving the lower third of the stomach was found and a subtotal gastrectomy of the anterior polya type was done. A long jejunal loop was utilized, the proximal portion of which was anastomosed to the lesser curvature of the stomach. An Abbott-Rawson tube was threaded into the distal jejunal loop for feeding purposes. The operation was without incident.

The first four postoperative days were uneventful. The feeding tube was removed on the third day and oral feedings well tolerated. On the fifth day pain and tenderness developed in the left upper quadrant. The pain was constant and was not colicky in nature. There was no abdominal distention, and no masses could be palpated. The pulse rate rose to 120 and the blood pressure fell to low levels. The patient vomited twice and it was noted that there was no evidence of bile or of small intestinal contents in the vomitus. Transfusions and vigorous supportive therapy were given but the patient died 18 hours later. Postmortem examination revealed a complete proximal jejunal obstruction at a point where the proximal jejunal loop passed between the distal anastomotic loop and the transverse colon. The obstruction was caused by pressure exerted by the mesentery of the distal jejunal loop (Figure 3). The entire small bowel

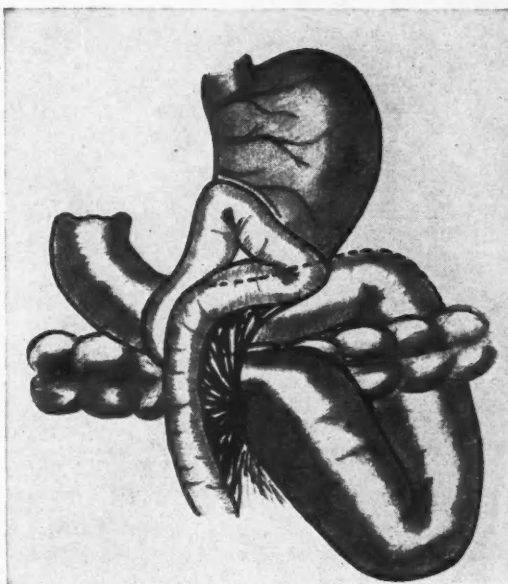


Figure 3.—Proximal jejunal loop obstruction. The duodenum and proximal jejunum are obstructed by the mesentery of the distal jejunal limb.

proximal to the obstruction was distended with bile-colored fluid and was gangrenous. There was an area of perforation in this segment on the anterior surface of the first portion of the jejunum. The duodenal stump was intact in spite of the severe distention, and the gastrojejunostomy stoma was normal.

CASE 2: The patient was a 53-year-old male with a history of peptic ulcer of 17 years' duration, with almost complete pyloric obstruction, and a 40-pound loss in weight.

Subtotal gastric resection was done and a penetrating ulcer 4 cm. in diameter was found on the posterior wall of the stomach near the lesser curvature. The lower half of the stomach was resected, leaving the ulcer bed on the pancreas; an anterior Hoffmeister repair was done, utilizing a long jejunal loop, the proximal portion of which was anastomosed to the lesser curvature of the gastric stoma. An Abbott-Rawson suction feeding tube was threaded into the distal jejunal loop. It was at first possible to recover bile from the gastric contents.

On the second day there was severe upper abdominal pain which was difficult to control with opiates. The pulse rate was elevated to 160 per minute, and the blood pressure fell to 60 mm. of mercury systolic and 40 mm. diastolic. The abdomen became distended and tender and it was noted that no bile was being returned through the gastric suction tube. Urinary suppression developed in spite of adequate parenteral fluids and during the subsequent 24 hours massive doses of plasma and blood (4,500 cc.) were given. The next day the condition of the patient seemed somewhat improved. The pulse fell to near normal limits and the blood pressure rose to 170 mm. systolic and 100 diastolic. The abdomen remained distended, tender and painful, however, with no evidence of peristalsis by auscultation. The patient died on the sixth postoperative day and at autopsy it was found that the proximal jejunum was completely obstructed by pressure exerted by the mesentery of the distal jejunal loop. The entire segment of jejunum and duodenum proximal to the point of obstruction was distended

and almost completely gangrenous (Figure 3). The gastroenterostomy stoma was patent and the duodenal stump was intact in spite of the pronounced distention.

CASE 3: An 81-year-old white male entered the hospital with clinical and x-ray evidence of pyloric carcinoma with almost complete obstruction. Subtotal gastrectomy was done for a large ulcer which was presumably carcinomatous, although the final report of the pathologist was "benign gastric ulcer." In a procedure of the anterior polya type, the distal jejunal loop was placed at the greater curvature of the stomach. The postoperative course was surprisingly smooth in view of the age of the patient, who left the hospital in good condition on the 16th postoperative day.

The patient remained in good health with no symptoms for nearly two years. Then one night he was awakened at 2 o'clock by severe abdominal pain which he attributed to an unusually large meal. The pain was continuous and the patient vomited previously eaten food. His wife stated that the vomitus did not appear bile-colored. Sent to the hospital, he was found to be in shock. The blood pressure was 68 mm. of mercury systolic and 58 mm. diastolic, the pulse rate 120, and the skin ashen. There was no vomiting at this time. Upon examination of the blood evidence of hemoconcentration was noted. The abdomen was slightly distended, non-rigid, but exquisitely tender, particularly in the left upper quadrant, with sounds of hypoactive peristalsis. An x-ray film of the abdomen showed no evidence of mechanical bowel obstruction or of free air within the peritoneal cavity. The diagnosis at the time of admission was coronary occlusion with possible mesenteric occlusion secondary to detached mural thrombi. Supportive therapy was given but the patient died 11 hours after admission. At autopsy arteriosclerosis was noted, and particularly arteriosclerosis of the vessels in the mesentery. There was obstruction of the proximal jejunal loop by the mesentery of the distal jejunal loop, with gangrene of the involved segment. The duodenal stump was intact and the gastroenterostomy stoma was normal.

CASE 4: The patient, a 49-year-old male, had a history of ulcer of the stomach of 25 years' duration with almost complete pyloric obstruction and a 15-pound loss in weight. Subtotal gastrectomy was performed for a duodenal ulcer which had penetrated into the head of the pancreas. The stomach showed the usual thickening and hypertrophy of long-continued obstruction. An anterior polya type anastomosis was done, and a long jejunal loop was used, the proximal limb being placed at the lesser curvature of the stomach. An Abbott-Rawson suction feeding tube was threaded into the distal jejunal loop. Some difficulty was encountered in freeing the duodenum from the pancreas in the region of the posterior perforation, but in general the procedure was without incident.

The first five postoperative days were uneventful. The feeding tube was removed on the third day and oral feedings including a soft diet were well tolerated. Late on the fifth day the patient noted abdominal discomfort. He became nauseated, and mild upper abdominal pain with distention developed. A Levine tube was inserted and approximately 1,000 cc. of gastric contents recovered. There was nothing resembling bile in this material. The upper abdominal pain became more severe and the patient also complained of severe but poorly localized pain in the lower left lumbar region. A large, firm, tender mass could be palpated in the left flank. The abdomen was silent. X-ray films of the abdomen showed nothing to suggest intestinal obstruction. The patient appeared to be in mild shock; there were beads of perspiration standing out on his forehead. In view of these findings and the absence of bile in

the vomitus, a diagnosis of proximal loop jejunal obstruction was made and an exploratory laparotomy was done.

The abdomen was opened and it was found that the proximal jejunum was obstructed by pressure exerted by the mesentery of the distal jejunum. The bowel proximal to the point of obstruction was dilated to four times average size and the picture presented was similar to that of small bowel volvulus. It was dusky blue in color but appeared viable, in that the color changed to nearly normal when the loop was withdrawn somewhat from the point of obstruction. In order to prevent recurrence, enteroanastomosis was done between the distal and proximal loops of jejunum.

Recovery was uneventful and the patient was discharged from the hospital on the 11th postoperative day. Two years later the patient was in good health with no dietary restrictions, had gained weight, and had had no recurrence of symptoms of ulcer.

CASE 5: The patient was a 39-year-old male with clinical and x-ray evidence typical of duodenal ulcer with pyloric stenosis. A subtotal gastrectomy was done and an anterior long loop polya type anastomosis was made, with the proximal jejunal loop placed at the lesser curvature. During the first six days it appeared that the gastrojejunostomy stoma was not functioning well although bile was constantly present. On the seventh day fluids began passing through the stoma and the patient's condition was quite satisfactory until the 11th day. The patient then vomited gastric contents in which there was no evidence of bile and complained of epigastric and left abdominal pain which was fairly constant in nature. The symptoms subsided when a Levine tube was inserted, and the tube was removed after two days. The patient remained in good condition until the 17th postoperative day, when severe upper abdominal pain developed. It continued although morphine was given. The patient vomited twice and it was noted that there was no evidence of bile in the vomitus. A semi-fluctuant, tender, movable mass could be palpated in the left upper quadrant and the patient appeared to be in mild shock. An x-ray film of the abdomen revealed no abnormalities, but a diagnosis of acute intestinal obstruction was made and exploratory laparotomy done.

It was found that the proximal loop of jejunum was obstructed by pressure exerted by the mesentery of the distal loop. The jejunum and duodenum were dilated to about five times normal size, but there was no evidence of leakage at the duodenal stump. An entero-enterostomy was made between the proximal and distal loops. Recovery was uneventful. Six years later the patient's weight was normal, there were no dietary restrictions, and there had been no recurrence of symptoms of ulcer.

DISCUSSION

The five cases presented have certain features in common. In each the complication of high, proximal closed-loop intestinal obstruction occurred following subtotal gastric resection with an anterior polya or Hoffmeister type of procedure in which the proximal jejunal loop was placed on the lesser curvature of the gastric stoma. In each case the mechanism of obstruction, as demonstrated by post-mortem examination or by laparotomy, was identical, namely, obstruction of the proximal loop due to pressure of a shortened mesentery of the distal loop which was placed along the greater curvature portion of the stomach. The continued secretion of bile and pancreatic juice into the closed loop caused pronounced distention of the duodenum and proxi-

mal jejunum in each case. In the three cases in which the patients died the pressure caused necrosis and gangrene. The increased intraluminal pressure noted in Case 1 was severe enough to result in perforation through the bowel wall. Remarkably, the duodenal stump remained intact in all cases despite what must have been great intraluminal pressure.

The clinical picture was similar in all cases in that the onset was abrupt; in four of the cases onset occurred in the early postoperative course. Continuous, unrelenting epigastric or left upper quadrant pain and tenderness, attended by clinical shock, were observed in all cases. In two instances the distended bowel was felt as a mass in the left upper quadrant. The vomiting was not continuous, repeated, or profuse, and the vomitus was characterized by the absence of bile and small bowel contents. It is in these two respects, namely, the character of the pain and vomiting, with absence of bile in the vomitus, that the condition under discussion differs from other forms of high intestinal obstruction or stomal edema.

In the three cases in which an x-ray film of the abdomen was made, there was no evidence of gas-filled, distended small bowel. This is to be expected, as there is, of course, no opportunity for swallowed air to enter the involved segments, and gas-forming bacilli are practically absent in this portion of the small bowel.

This particular mechanical complication could, of course, be avoided by making the gastrointestinal anastomosis posterior rather than anterior to the transverse colon. There are, however, numerous complications associated with retrocolic anastomosis which have been well described in the literature.

Another cause of difficulty later is a tendency, in doing a retrocolic anastomosis, to skimp somewhat on the amount of stomach resected because of the technical difficulties involved.

Possibly further experiences with bilateral vagotomy with conservative posterior resection will prove helpful on this point. It should be noted, incidentally, that in the five cases reported herein, none of the patients were suitable candidates for vagotomy according to present-day indications for this operation.

The complication described in this presentation cannot be prevented by selecting a jejunal loop more distal to the ligament of Treitz in the hope of obtaining a longer loop with which to make the anastomosis, since the length of the mesentery is never greater than it is at a point approximately one foot distal to the duodenal jejunal juncture.

It can be prevented, however, by routinely attaching the proximal jejunal loop to the greater curvature, with the distal loop along the lesser curvature, as this procedure occasions no torsion on the mesentery. This method would appear to be somewhat more mechanically and physiologically correct because it can be accomplished by selecting a loop of jejunum nearer the duodenojejunal juncture for the anastomosis, thereby lessening the hazard of postoperative jejunal ulceration.

It has been pointed out that the more distal the jejunal loop selected for the anastomosis, the more liable jejunal ulceration is to occur, since the jejunum is not prepared by nature to receive acid contents. It is the opinion of the authors, however, that the development of a marginal ulcer is evidence of too conservative a resection rather than of the employment of too long a jejunal loop. In a series of 500 anterior long loop anastomoses, there was only one known recurrent ulceration. It occurred in a patient who was, incidentally, a chronic alcoholic.

Since peristalsis in the stomach is directed toward the pylorus, placing the distal loop at the lesser curvature appears somewhat more nearly isoperistaltic than the reverse.

While removal of most of the lesser curvature at the time of the resection will thus place the distal loop of jejunum at a very high level, this has proven to be an advantage, in that the stomach will empty more slowly and this has considerably reduced the incidence of the distressing symptoms now generally described as the "dumping syndrome."

Successful treatment of proximal jejunal loop obstruction lies in prompt recognition and surgical intervention. The complication can be corrected surgically by performance of an enteroanastomosis between the distended and collapsed jejunal loops. It is not felt, however, that this would justify the routine employment of an enteroanastomosis in view of the fact that diversion of the alkaline bile from the area of the stoma appears to increase the incidence of marginal ulceration. In this regard it should be noted that proximal jejunal loop obstruction occurred in only about 1 per cent of cases in a series of 500 anterior long loop anastomoses. Attention should be called to the fact that in the three cases in which the nature of the complication was not recognized, the patients died, while the two patients who underwent surgical intervention not only were relieved of the obstruction but obtained relief from the condition for which the primary operation was done.

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Recent Trends in Public Health

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SUMMARY

Environmental sanitation is experiencing a reawakening with concerted drives at control of water and atmospheric pollution, mosquito and rodent control, and improvement in restaurant sanitation. Communicable disease control efforts are being intensified.

With prolongation of life, chronic diseases are assuming increasing importance as public health problems. Maintenance of standards of hospitals and provision for more adequate hospital facilities are also receiving attention. Mental health and chronic alcoholism are being considered as a public health problem.

With all these new trends emphasizing prevention of disease, increasing teamwork between physicians in private practice and in public health practice is being manifested. Preventive medicine and public health are now a recognized specialty in medicine.

ONE hundred years have passed since the organized public health movement in the United States received its first real impetus. The beginnings of the modern public health department in this country date from the appointment in 1848 of a "sanitary commission" by the Governor of Massachusetts "to prepare and report to the next General Court a plan for a sanitary survey of the state, embracing a statement of such fact and suggestions as they think proper." Lemuel Shattuck, the great public health pioneer, was chairman of the three-man commission. The "Report of the Sanitary Commission" submitted on April 25, 1850, formulated for the first time the basic pattern for the development of public health.¹⁰ This report "Contained an outline of a state system of public health administration so comprehensive that even today it may serve as an ideal for future realization."¹¹ The succeeding half century saw the revolution wrought by the founding of the science of bacteriology and the early experimental work which laid the foundation for the science of public health engineering with its modern methods of water and sewage treatment.⁸ Then followed methods for pasteurization of milk, control of insects and rodents and the development of other phases of environmental sanitation. The vast changes in human health and welfare emerging from this phase of public health endeavor were accomplished for the most part through the application of engineering principles. The result has been phenomenal. From the year 1856 to 1945

typhoid fever decreased 99 per cent, diarrhea and enteritis 97 per cent, and yellow fever and cholera have ceased to exist in the United States.² These achievements were largely due to advances in environmental sanitation. Do these remarkable achievements mean that the main problems relating to environmental sanitation have been solved? Lest the job be considered complete, it is recommended that consideration be given the recent summary by Wolman¹² entitled "Sanitation of Yesterday—But What of Tomorrow."

Referring to water and waste disposal, Wolman states, "In the State of Massachusetts as in the rest of the United States, it is doubtful whether there is a single stream today which has not deteriorated in a major sense in its quality since 1849. There is hardly a city in Massachusetts or one in the rest of the United States, in which the conditions of housing are not essentially worse than those at which the Shattuck report directed severe criticism. There is not a city in Massachusetts or one in the rest of the United States . . . in which the conditions of the atmosphere are not immeasurably worse today than they were when Mr. Shattuck leveled his attack on this phase of the environment."

Consider the pollution of rivers, harbors, and beaches of California, the substandard housing in both metropolitan and agricultural areas, and the atmospheric pollution of large and populous areas of the state to see the application of Wolman's statement. Add to this the potential hazards of mass application of insecticides, fungicides and pesticides to the fields, orchards and storehouses throughout the state, and another environmental sanitation problem appears.

In California, particularly, the environmental sanitation problems are further complicated by the vast migration of farm laborers and of vacationists and tourists which characterizes life in California, and also by the rapid industrialization of the state with the consequent industrial environmental sanitation problems.

During the century since the founding of modern sanitation, we have gone far in the elimination of epidemic diseases which are borne in water and milk or by insects. Yet during this time other environmental conditions have gradually developed which are important actual or potential hazards to health.

It is only in recent years that we have come to realize the magnitude of these latter sanitation problems and have begun doing something about them. This is one of the recent trends in public health in California. The State Board of Public Health three years ago determined that the dumping of raw sewage into the waters of the state must cease. A

Chairman's address, read before the Section on Public Health, at the 78th Annual Session of the California Medical Association, May 8-11, 1949, Los Angeles.

resolution of the board called for review of all outstanding permits for sewage disposal and directed that no new permits would be issued to communities unless the sewage were properly treated.⁷ Santa Monica Beach was quarantined and court action instituted against the City of Los Angeles. The result has been the development of an extensive sewage disposal project. Cities in increasing number are taking steps to solve their sewage disposal problems. Most of some \$75 million appropriated by the State Legislature for construction of local facilities has been used for modernization of sewage disposal systems. This trend has been reinforced by Congressional enactment of a Federal Stream Pollution Control law. This will serve to stimulate a nationwide attack on stream pollution. The California State Legislature has also taken cognizance of the atmospheric pollution problem and provided a legal pattern for the establishment of air pollution control districts. Such a district is now in operation in Los Angeles County. Concurrently the State Department of Public Health is tightening up on municipal garbage and refuse disposal. The state and local health departments are re-emphasizing enforcement of restaurant sanitation in which they are aided by the recently enacted Restaurant Sanitation Act.¹ Other fields of environmental sanitation such as intensification of mosquito and rodent control are also under way. While these activities may be said to have as a primary purpose the prevention of communicable diseases, the implications are much broader. A clean, wholesome atmosphere; clean, wholesome lakes, beaches, streams, and recreation areas; light, well-ventilated, clean houses; and rodent- and insect-free communities all contribute to health in a positive way beyond the prevention of communicable disease.

Truly, this intensified attack on problems in the field of environmental sanitation is one of the most significant recent trends in public health.

COMMUNICABLE DISEASE CONTROL

The developments through the past century have involved primarily health departments in their association with sanitary and construction engineers coupled with extensive public construction projects. Physicians were not directly involved. They were indirectly involved, however, in that their medical practice changed with the decline in the incidence of the various water-, food- and insect-borne communicable disease.

In contrast to this, however, is the role played by the practicing physician in the phase of public health progress next to be discussed. Almost at once after the identification of bacteria as causative agents of disease it became evident that all communicable diseases were not amenable to control through environmental sanitation measures. In some instances, such as smallpox and diphtheria, specific immunization techniques were early developed. Others have followed. Immediately the practicing physician and the health department became partners in the planning and execution of mass immuni-

zation projects. For many years such projects were spotty and sporadic. As health departments developed into efficiently operating organizations, such programs took on form and substance. The physician gained confidence in the health department, and cooperation in such projects became an accepted practice. It is now recognized that the prevention of smallpox, diphtheria and pertussis is dependent upon the immunization of the individual. Much of this is done ordinarily by the physician as part of his regular practice. Yet there must be careful organization, planning and education of the public by the health department if the larger percentage of the community is to be immunized. As state and local health departments are becoming staffed with professionally trained and qualified personnel this partnership between health departments and physicians in immunization programs is assuming a new significance.

Certain communicable diseases are not primarily amenable to either improved sanitation or immunization. Tuberculosis is such a disease. Efforts to control this disease bring even one step closer the working relationship between the health department and the practicing physician. Perhaps one of the most significant and far-reaching single recent trends in public health is the plan to secure chest x-ray films of some four million California adults. This is to be an all-out attempt to locate and bring under control the bulk of the remaining infectious cases of tuberculosis in the state. This has been planned and is to be executed not only by the health department and the practicing physician, but by the entire community. In these mass surveys, physicians and health officers will not only accelerate the control of tuberculosis but in addition will have an opportunity to experiment jointly in community-wide organization and operation of a health project. This trend toward community-wide participation in public health projects under the leadership of physicians and the health department may have far-reaching significance. It may well provide experience from which varied future community-wide health projects may develop.

CHRONIC DISEASE CONTROL

All the previously mentioned developments of the past century have resulted in a changing age distribution of our population. This has necessitated a shift in public health emphasis. Diminishing neonatal and infant death rates, practical elimination of a number of major communicable diseases, pronounced reduction of maternal death rates, and, more recently, the amazing saving of life being wrought by specific chemotherapy and antibiotic therapy, have all contributed to the prolongation of life. The average age of the populace is increasing. As acute infectious diseases decrease, chronic diseases such as cancer, diabetes, heart disease and arthritis assume an ever-increasing importance in the total public health picture. In the recent study by the chronic disease service of the California State Department of Public Health, it

was shown that from 1910 to 1940 the death rate from a selected group of chronic diseases increased from 555 to 762 per 100,000. At the same time the death rates from a selected group of communicable diseases decreased from 413 to 126.⁵

This changing age distribution of the population with the increasing importance of chronic diseases as the major cause of morbidity and mortality (and consequently as public health problems) is another significant recent trend in public health. As this field of activity develops, health departments and practicing physicians will be brought into even closer working relationships than ever before. Careful study and experimentation will be required to delineate the areas of responsibility of each. A beginning has been made in California through the chronic disease study authorized by the Legislature two years ago and recently completed by the State Department of Public Health. The report⁵ was the result of the joint efforts of the State Department of Public Health, the California Medical Association, and other professional and lay organizations. In it the main elements of the chronic disease problem together with approaches to a solution were presented. Still another recent development is the pilot study of a technique for finding and placing under medical care persons with some of the chronic diseases. This was carried out recently in San Jose under the auspices of the Santa Clara County Medical Society. (A report of this multiphasic survey was published in the December 1949 issue of CALIFORNIA MEDICINE.) Here is a further example of a type of health department-medical association cooperative endeavor that promises much for the future.

HEALTH DEPARTMENTS AND HOSPITALS

Still another recent trend worthy of mention pertains to responsibilities recently given to health departments in the hospital field. In an effort to insure reasonably safe and effective hospital facilities, a system of inspection and licensing of hospitals by the State Department of Public Health has been established. Furthermore, for the first time considered attention is being given to quantitative needs and geographic location of hospitals. Under recent federal and state legislation, a statewide survey has been made of present hospital and health center facilities.⁶ Additional needs in the various categories of hospital beds and of health centers have been defined. Public funds, both federal and state, have been made available to assist in the construction of needed facilities. Up to this time funds have been allotted to assist in the construction of some 23 hospitals in rural areas of the state. In the planning of these programs, physicians, hospital administrators, representatives of the public being served, and the health departments are brought together. Here is another example of how cooperative planning and action are beginning to meet an urgent public health need.

MENTAL HEALTH

The prevention of mental illness is a vast new territory awaiting the plow. Modern public health is beginning to appreciate its responsibility in this large field of human illness. The attack in this field simulates in many ways the administrative procedures required in the field of the other chronic diseases. Here is an individual problem with each patient requiring an individual approach. Some progress has already been made in the development of techniques for attacking this problem. The objective is to prevent mental illness. It is now recognized that through proper training of parents and others dealing with children in their formative years, much can be done to prevent the development of abnormal personality traits. Failing prevention, the next objective is to find mental illness in the incipient stages when corrective measures may be most effectively applied. Only a bare beginning has been made in the development of the public health program in this field. Congress has enacted legislation authorizing the establishment of a National Institute of Mental Health for research and demonstration. Federal appropriations have also been made that provide grants-in-aid to states to develop this public health program.³ Here is presented a unique opportunity for physicians and health departments to jointly develop an urgently needed area of public health.

CHRONIC ALCOHOLISM

Yet another trend is in the direction of recognizing chronic alcoholism as a disease and approaching the condition as primarily a medical problem. The California Medical Association during the past year has shown its concern and has appointed a committee to study this problem and prepare a report for the Association.* Already the concept of a medical approach to this problem is gaining support throughout the state. Several local governments of the state are currently giving serious consideration to substantial appropriations for the provision of medical facilities to attack this problem.

DEVELOPMENT OF LOCAL HEALTH SERVICES

All the trends mentioned thus far pertain to specific health problems. One of the most significant recent trends, however, is in the field of public health administration. The California Local Public Health Assistance Act, which was passed by the 1947 California Legislature, provided a state subsidy for local health work designed to strengthen and extend local health departments in the state. The act also created a Conference of Local Health Officers. It provides that this conference must approve any regulations pertaining to the administration of the subsidy prior to adoption by the State Board of Public Health. This unique organization is already coming to play a dominant role in directing the currents of the new trends in public health in California. It represents a new departure in public health administration wherein the local

* See Page 40, this issue.

health officer becomes a full-fledged partner in planning the statewide public health program.⁴ This action represents a long step forward in cooperative planning for public health administration. It is noteworthy that the California Medical Association played a significant role in the formulation of this legislation.

HEALTH DEPARTMENT-MEDICAL ASSOCIATION COOPERATION

For several years the director of the State Department of Public Health has been meeting regularly with the Council of the California Medical Association at the invitation of the Council. Many of the new trends in public health already discussed have been considered in these joint meetings. A significant expansion of this general procedure is now under consideration involving the appointment of a joint study committee composed of representatives of the Council of the California Medical Association and the Conference of Local Health Officers. All problems pertaining to public health that come before the Council would be referred to this joint committee for study and referral back to the Council with recommendations.

Furthermore, in some counties local health officers have been participating in the meetings of executive committees or councils of local medical associations on a basis comparable to the relationship established by the director of the State Health Department and the Council of the C.M.A.

All of these new trends facilitate mutual trust and understanding between health departments and the medical associations, with resulting benefit to the people of California whom we as physicians all serve.

THE PROFESSIONALIZATION OF PUBLIC HEALTH

There is one additional trend in public health which is most significant. This is the trend toward professionalization of the numerous special disciplines in public health. Since the era when appointments to public health positions were dictated by political expediency, tremendous strides have been made toward requiring specialized training for eligibility to public health positions. Competitive examinations are more and more being utilized as the basis for selections. Shepard⁹ recently reviewed this trend in public health and pointed out the part the American Public Health Association has played

in the development of personnel standards in the various specialties in public health.

A recent development in this field which is particularly significant to all physicians is the creation by the American Medical Association of the American Board of Preventive Medicine and Public Health. By this act the A.M.A. has given formal recognition to preventive medicine and public health as a specialty in the medical field. This can only add to the stature and importance of the public health section of the California Medical Association. At the same time, it should further facilitate the development of even closer working relationships between official health departments and the state and county medical associations in California. It is the culmination of a trend long since inaugurated which is designed to utilize even more fully the talents of our profession in planning public health programs and in helping to solve the perplexing public health problems faced by the people of California.

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The Shoe-Fitting Fluoroscope as a Radiation Hazard

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SUMMARY

Tests of direct beam intensity and stray radiation from shoe-fitting fluoroscopes indicate wide variability of exposure of patrons and salesmen, with some exposures far in excess of standards proposed for safe use of the apparatus.

The principal potential danger is interference with bone growth in children as a result of careless use or uncontrolled dosage of x-ray. Although less likely, there is also some possibility of excessive exposure of shoe salesmen in exceptional circumstances.

The growing probability of increasing use of ionizing radiations warrants vigorous governmental control or possibly elimination of procedures of questionable merit which involve public risk.

THE fluoroscopic shoe-fitting machine has been used in this country for approximately 25 years. During that time hundreds of thousands of adults and children have had their feet exposed at intervals to x-ray beams. Yet, because of the latent period between cause and effect in low dosage radiation, it is impossible at present to determine merely by clinical examination whether or not deleterious influences have been produced by this device. It is also difficult to estimate the probability of harmful effect.

Despite the relatively long experience in the use of the fluoroscopic shoe fitter, it is remarkable that scientific studies on x-ray dosage of the instruments have been published only during the past two or three years.^{11, 6, 4, 10} Current interest in this subject is no doubt attributable to the fact that physicians and health physicists everywhere are beginning to be concerned about every potential source of radiation, because of the possibility that widespread even though mild contamination may result from peaceful utilization of nuclear fission, quite irrespective of the potentialities of the atomic bomb. Also, wartime experience with careless use of portable fluoroscopic devices in industrial medical departments has encouraged increased precaution not only among radiologists but among others who use x-rays as well.

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The investigation here reported was conducted with the cooperation of the staff of the Division of Industrial Safety of the California State Department of Industrial Relations and the Bureau of Adult Health of the California State Department of Public Health.

Since there have been several recent reports of the extent of radiation exposure involved in the use of shoe-fitting fluoroscopes, the question may arise as to the need for an additional report on this subject. The following data are presented principally for three reasons: (1) Radiation intensities were determined for weekly exposures of employees. (2) The observations made and the techniques used for monitoring the shoe-fitting machines provide some basis for the discussion of instrumentation in general. (3) The additional data represent confirmation in another region of the country (the San Francisco Bay area) of findings already established elsewhere,^{11, 6, 4} and provide a wide basis for review of the public health implications of the device in question.

A detailed description of the x-ray shoe-fitting machine is given in the report by Fredrick and Smith.⁶ The instrument consists of an ordinary fluoroscope, the x-ray tube of which is placed near the floor. The opening for the customer's feet is situated between the tube and a fluoroscopic screen, and the light image is reflected to three openings at the top of the apparatus, where the customer and the salesman, as well as a third person, may view the fitting. Usually there is an aluminum filter placed between the feet and the x-ray tube, but this is frequently either worn or absent.⁴ The degree of shielding varies with the apparatus and its maintenance. The most modern type of machine is shielded with lead lining in the box containing the tube, and the eyes of the viewers are protected by means of a leaded glass over the fluoroscopic screen. Fredrick and Smith⁶ report observation of machines with oil-immersed x-ray tubes.

Most of the machines were rated at 7 milliamperes maximum current, although several were operated at higher levels as shown by milliammeters observed during operation. The tubes operated at 50 kilovolts in all instances where kilovoltage was determined. Two home-made machines were found in which no electrical instruments were installed. No attempt was made to determine the physical and electrical factors of the machines since this information has already been well established.⁶ This study was directed principally toward an accurate determination of the intensity and relative dosage to which both employees and customers were exposed in the course of normal operations. Even this purpose was not entirely achieved, since it was impossible to maintain sufficient supervision of the shoe salesmen to determine accurately the degree of exposure without producing a nullifying antagonism on their part.

INSTRUMENTATION

Portable apparatus currently available for the determination of x-ray exposures consists principally of the following: (1) ionization chambers of the pencil dosimeter (minometer or electroscope) type; (2) the ion chamber or ionization rate meters; (3) the dosimeter r-meter; (4) the film badge; (5) the Geiger-Müller counter. Although other investigators have used the dosimeter r-meter for detecting stray radiation, it was considered advisable to use the minometer ionization chambers (Victoreen) for this purpose during the brief periods of operation of the machines. The minometer chambers used have maximum capacities of 10, 100 and 200 mr. Three readings were made at each site in most instances. Excellent reproducibility of results was found and all ionization chamber instruments functioned well under conditions of normal humidity. On foggy and humid days it was impossible to charge the chambers. Victoreen dosimeter r-meter chambers with a capacity of 100 r maximum were used for detecting direct beam radiation.

For measurement of weekly exposure each salesman was provided with two film badges. One of these was to be worn in the trouser watch pocket and the other in a trouser cuff. Sales ladies were requested to place one badge in their clothing near the belt and the other inside a shoe. These were worn for 40 hours weekly and exposure was determined by densitometer readings according to standard technique.

PRIMARY X-RAY BEAM INTENSITY

Measurements were made directly within the shoe-fitting chamber on 40 machines and by use of the dosimeter r-meter (Victoreen). Exposures were timed for 30 seconds. Table 1 indicates the primary beam dosage of the machines tested. Chart 1 shows the distribution of doses and demonstrates graphically the variation from machine to machine. It will be noted that there was a range from 12 to 107 r per minute, with an average of 38.4 r per minute. Although no tests were made with a customer's foot in the apparatus, these values give a conservative approximation of the range of radiation to which skin and tissue may be subjected. It is of interest here to point out that several shoe salesmen volunteered the information that they frequently placed their hands within the fitting opening to demonstrate to parents and customers the nature of the fit or to place the foot in a more favorable position for viewing while another salesman operated the machine. It would be interesting to determine the actual exposure per customer and the amount of time during which shoe salesmen are subjected to stray radiation during the course of the day. In this study no such measurements were possible except for casual observations which indicated that there was little inclination to be satisfied with a single timed exposure. Some of the machines were set for five seconds and others for 20 to 30 seconds, but these times were frequently found to be insufficient

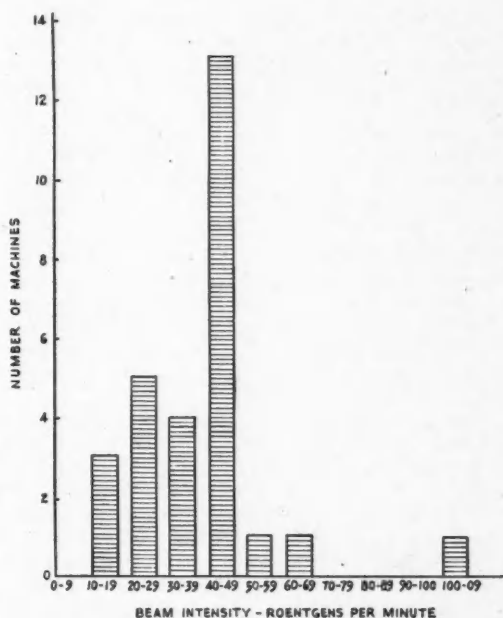


Chart 1.—Distribution of beam intensities in roentgens per minute, measured by placing dosimeter r-meter within shoe-fitting chamber (40 machines).

TABLE 1.—Direct Beam Exposure to Foot*
Roentgens per Minute

Mean	Median	Maximum	Minimum
38.4	40	107	12

* Measured with Victoreen dosimeter r-meter within foot opening.

for customer satisfaction. The possibilities for multiple exposure to the direct beam are obvious when one considers the frequency with which some patrons may go from store to store, at each of which there may be several fittings.

Seventy-seven salesmen cooperated in this part of the study and readings were made of film badges which were worn for one week in each instance. There were several instances in which the film badges were lost or misplaced and these, unfortunately, were usually the film badges placed in the trouser cuffs. Table 2 and Chart 2 indicate the range of dosage in the two parts of the body surveyed. These data are admittedly rough since there were several instances in which it was known that film badges originally placed in the trouser cuff were later placed in the watch pocket and occasionally there were days during which the film badges were not worn at all. This may account for the relatively large number of zero readings reported.

STRAY RADIATION

Chart 3 represents a plan view of a shoe-fitting machine. Points at which measurements were made are indicated by Numbers 1 to 10. The extent of

leakage of radiation about the machine is shown in Table 3 for the various positions tested. These observations were made with Victoreen minometer ionization chambers with capacities of 10, 100 and 200 mr. It will be noted that a high degree of scatter was found at the foot opening of the machine and that fairly high values also were obtained when the instrument was placed beside the foot being examined. Although the leaded glass shield usually protected the eyes, there were some instances in which as much as 9 mr per minute was recorded at the viewing point. This was probably attributable to the fact that the leaded glass was not always placed in proper position and leakage occurred around the margin.

DISCUSSION

This investigation was concerned only with the potential hazard of radiation exposure. It has been pointed out by others that the shoe-fitting fluoroscope is an electrical device supplied by a high-voltage current and that the possibility of electric shock is also involved. In no known instance was adequate maintenance supplied either by the manufacturer or distributor of the machines. Successful continuous operation of the apparatus is dependent chiefly upon the original construction, since

most of the shoe store managers were unfamiliar with possible facilities for repair or testing of machines.

Evaluation of the effect of exposure upon salesmen and shoe store clientele must be based upon established levels of x-ray tolerance. The value of 0.1 r per day was widely accepted for x-ray and gamma ray exposure by most official and other agencies until 1949. At present a new value of 0.3 r per week is suggested as a maximum tolerance.⁹ This value is admittedly conservative, but is based upon the view that during peacetime every effort should be made to maintain as low an exposure to ionizing radiation as can be achieved.

It appears quite obvious from the data presented that shoe store salesmen in general are not ordinarily subjected to doses beyond tolerance limits. In fact, assuming the reliability of the observations

TABLE 2.—Stray Radiation Exposure to Salesmen*

Location	No. of Salesmen	Exposure—mr per week—			
		Mean	100 to 300	10 to 100	Not Detectable
In trouser cuff	58	15.0	2	23	33
In watch pocket	74	7.1	0	22	52

* Measured by film badge densitometer technique.

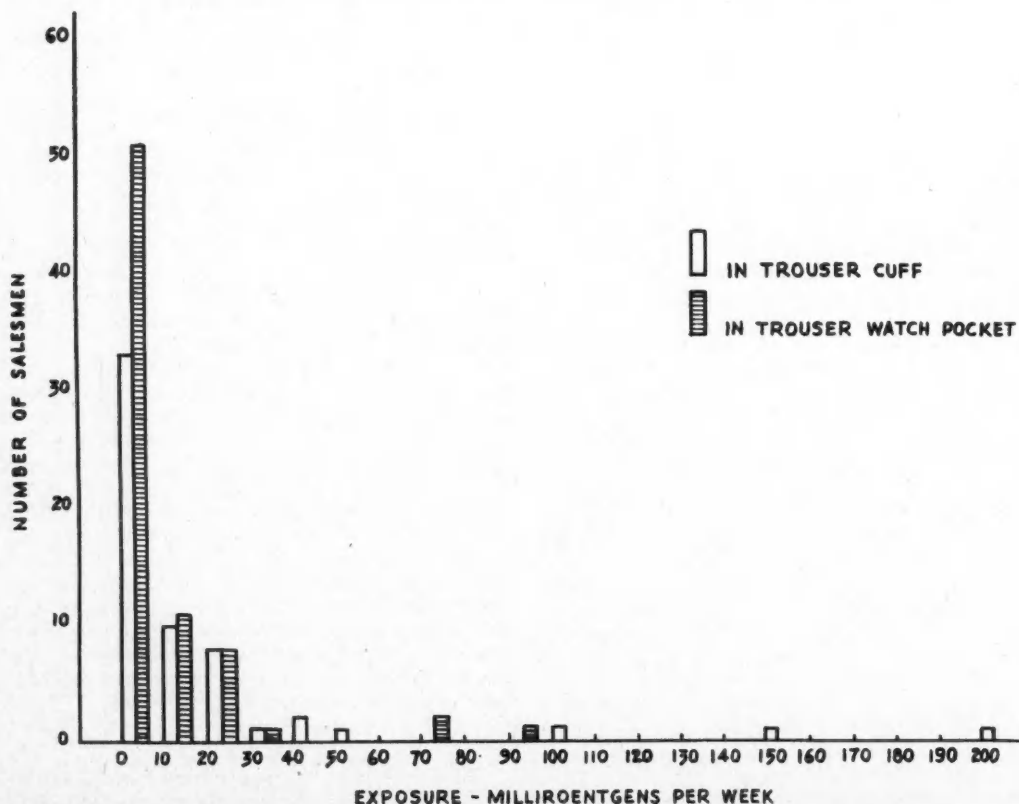


Chart 2.—Range of weekly exposures of shoe salesmen, measured by film badge technique.

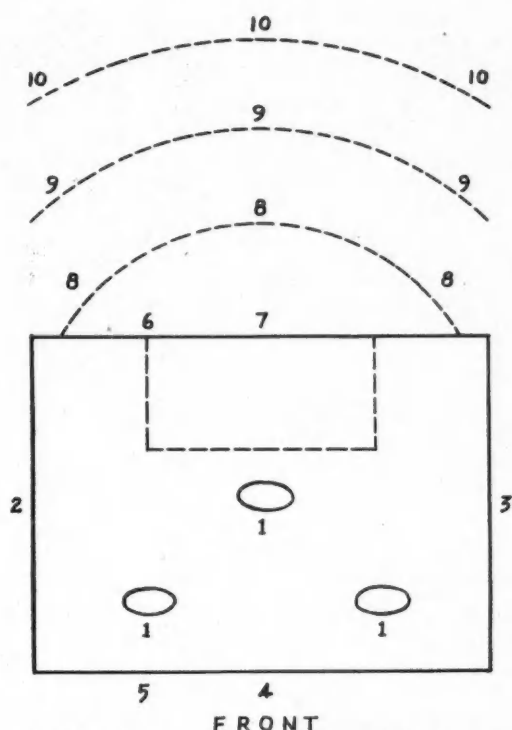


Chart 3.—Plan view of shoe-fitting machine. Numbers refer to points at which stray radiation was measured (see Table 3).

(with the exceptions already noted), most of the salesmen had almost no detectable exposure during the course of a week. Clinical observations were not made but casual inquiry concerning skin effects and other possible radiation injury gave negative results even among salesmen who had used the fluoroscope for as long as five years.

It is equally clear, however, that the customers being fitted usually receive a very substantial dose of radiation. While the feet admittedly represent only a small proportion of the total body tissue, and, therefore, the total dosage may not often be of significance so far as systemic effect is concerned, potentialities for skin damage or injury to the bone structures of a growing foot are undoubtedly present. The American Standards Association² has recommended a limit of 2 r per exposure for shoe-fitting machines. On the basis of a 20-second exposure the values reported by various observers would be as shown in Table 4.

It may be anticipated that the suggested limit of 2 r per fitting will usually be greatly exceeded in practice. However, evaluation of hazard should depend upon more than an arbitrary limit, and evidence of potential harm must be more thoroughly considered.

According to Ellinger,⁵ "On the basis of present knowledge it must be assumed that depth doses of 150 r in infants and 300 r in children are capable

TABLE 3.—Stray Radiation Around Machine

Position (See Chart 3)	Total No. Readings Made	Exposure—mr per Minute of Operation				
		Mean	100- 400	10- 100	1-10	Not De- tectable
1. Eyepieces.....	24	1.0	0	0	4	20
2. Floor—left side....	38	4.1	0	6	6	26
3. Floor—right side....	37	1.4	0	1	8	28
4. Floor—front.....	37	1.9	0	3	8	26
5. Operator's switch....	22	3.7	0	4	2	16
6. Beside foot.....	18	100.0	10	8	0	0
7. At opening.....	32	247.8	32†	0	0	0
8. 1 ft. from opening....	22	60.2	4	18	0	0
9. 2 ft. from opening....	22	22.5	0	20	2	0
10. 3 ft. from opening....	11	23.4	1	7	3	0
6 ft. from opening....	11	3.5	0	1	3	7

* Measured with minometer ionization chamber pencils.

† Readings of 400 mr or above on seven machines.

TABLE 4.—X-ray Doses for 20-second Fitting

Observer	Maximum Dosage (r)	Mean Dosage (r)
Williams ¹¹	116.0	
A.M.A. Editorial ⁴	46.7	
Fredrick and Smith ⁶	25.0	14.3
Lewis and Caplan.....	35.7	12.8

of causing growth disturbances." There is good evidence that the epiphyses, rather than the shafts of bones, are the susceptible areas. The potentialities for damage are quite clear when a single 20-second exposure to the shoe-fitting machine may exceed one-third of the hazardous dose for children.

Aside from specific epiphyseal damage, there is another consideration which must arise in any radiation exposure. Lapp and Andrews⁸ point out: "Whatever the permissible exposure may be, all workers must recognize that any amount of radiation is potentially dangerous and should be avoided . . . Present evidence indicates that at least some radiation injuries are statistical processes that do not have a threshold. If this evidence is valid, there is no exposure which is absolutely safe and which produces no effect." This point of view is thoroughly supported by recently reported observations that the incidence of cancer among exposed mice begins to rise with the lowest measurable dosage of ionizing radiation. It would seem advisable, therefore, that voluntary exposure should be limited to cosmic radiation, essential diagnostic radiography and natural or induced environmental sources of radioactivity.

CONCLUSION

The shoe-fitting fluoroscope is not an instrument with obviously hazardous potentialities. It has long been used and no direct clinical evidence of harm has yet been established. However, any x-ray apparatus represents a source of insidious harmful radiation, the use or abuse of which may lead to significant damage, often without recognition of clearcut causal relationship.⁷ The early history of the use of diagnostic x-irradiation without precaution and the subsequent appearance of skin and neoplastic changes after years of latency should provide ade-

quate warning against careless exposure to any source of ionizing radiation.

Sufficient information has now been accumulated to prove that the fluoroscopic shoe-fitting machine represents a potential, if not obvious, hazard. The question which must be answered by health authorities is whether these machines should be subjected to strict regulation or eliminated entirely. The answer to this question depends in part upon a consideration of the usefulness of the devices. If fluoroscopy is essential to shoe fitting, its use can probably be rendered safe. This will necessarily involve training of personnel and frequent inspection, the efficacy of which is always limited. In this connection it is interesting that of the 77 salesmen interviewed at least half were of the opinion that the machine was not of use in scientific shoe fitting. Most of them were of the opinion that it was chiefly useful for sales promotion and only a small minority favored its use for more satisfactory fitting, particularly of children. In several instances shoe-fitting machines were found in shops where they had long been relegated to disuse.

No attempt will be made to settle the issue of policy, the determination of which should lead to proper action on the part of public health or governmental industrial hygiene agencies. (See resolution adopted by the American Conference of Governmental Industrial Hygienists.¹) If regulation is the procedure of choice, the "requirements for the safe operation of fluoroscopic shoe-fitting devices" incorporated in the article by Fredrick and Smith⁶ are recommended for consideration.* In order to operate at the suggested value of 12 r per minute, however, it will be necessary that machines be maintained in good order. The lower intensities suggested for women and children are advisable but the difficulty of supervising proper use of a graded scale of exposure must not be underestimated.

* On March 1, 1948, "Regulations Governing the Operation and Maintenance of Apparatus Used for Shoe-Fitting Fluoroscopy" became effective under the sanitary code of the City of New York.⁸ These specify a maximum permissible dose of 2 r per exposure, limit the number of exposures to three per day and 12 per year. Stray radiation exposure of employees is not to exceed 12.5 mr per hour.

The Detroit department of health requirements⁹ are in general comparable to those of New York, but, instead of specifying dosage per exposure, permit a direct beam intensity maximum of 12 r per minute for five seconds (less for women and children) and a maximum of five fittings per day and 20 per year. At 12 r per minute, five fittings of five seconds each result in a dose of 5 r.

Although, as has been stated, no attempt will be made here to resolve the basic question of policy, the arguments in favor of elimination of the shoe-fitting fluoroscope can be very simply stated. The difficulties of inspection and maintenance are well known to safety and health agencies. Machines inspected today may be modified by removal of screens or filters and rendered extremely hazardous tomorrow. Furthermore, the most extensive set of regulations will not prevent careless exposure of the hands, excessive irradiation of the growing child's foot, or other improper use since it is difficult to establish fear of a harmful material as intangible as an x-ray. In view of the probability of improper use and because of uncertain knowledge as to the danger of cumulative small dosage of x-ray, it is clear that a very good case can be made for the removal of these devices from commercial shoe stores. This is particularly true in view of the lack of proof of their merit as scientific devices for fitting shoes.

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Coccidioidin Skin Testing During Pregnancy and in Infants and Children

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SUMMARY

Results of a study of 220 newborn infants in an endemic area indicate coccidioidal infection is not transmitted congenitally.

Skin testing of 595 infants and children disclosed that coccidioidal infection may be acquired at a very early age—as early as one month. The children tested were divided into various age groups, and the incidence of infection increased gradually from the lowest age group to the highest.

THIS presentation has a twofold purpose, the first to consider the possibility of discovering coccidioidal infection in newborn infants in an endemic area, the second to consider the earliest average age at which the first positive reaction to a coccidioidin skin test may be obtained. The latter is also to bridge a gap that Gifford⁵ and Thorner¹³ did not cover in their studies.

Coccidioidin skin tests have been carried out by such investigators as Smith,^{10,11} Gifford,⁵ Thorner¹³ and others^{1,2,4,7,8} in the San Joaquin Valley endemic area. The tests were made for various purposes—to determine coccidioidin sensitivity ratios among children and adults in the area, to discover new cases, and to investigate epidemiological problems. Gifford,⁵ in a study on preschool and school children, found positive reactions in over half of the 2,718 children tested. This percentage increased progressively from 17 per cent among children who had lived in Kern County less than one year to 77 per cent among those who had lived in this vicinity for ten years or more. Gifford⁶ also found in testing the inmates of the old people's home in Kern County that 90 per cent had positive reaction to coccidioidin. Persons in this group had lived in the southern San Joaquin Valley a minimum of 20 years.

Reviewing the literature as spade work for the present study, the authors were surprised to find only one report of a case of coccidioidal infection in an infant.⁹

Opportunity to study the possibility of congenital coccidioidal infection was given the authors when they attended two newborn babies whose mothers had coccidioidal meningitis. One of the mothers was a Negro who was delivered of a premature infant, the other was Caucasian and delivery was at term. Blood and spinal fluid from both of the mothers and both infants were sent to Stanford

University School of Medicine for complement fixation and agglutination tests.

Results of tests of the Negro mother were:

Serological Test

Serial Dilutions of Serum (0.25 cc.)						
1:2	1:4	1:8	1:16	1:32	1:64	1:256
+++++	++++	++++	++++	++++	+++	+

Precipitin Tests

Serial Dilutions of Antigen			
Undiluted	1:10	1:40	1:100
++++	+++	+++	

The conclusion reported was: "The findings were characteristic of progressive disseminated coccidioidal infection (coccidioidal granuloma). The presence of precipitins indicated recently acquired infection."

Results of serological tests of the infant were:

Blood: Complement Fixation Test

Dilution		
1:2	1:4	1:8
+++	+	0

Spinal Fluid: Complement Fixation

Dilution		
1:2	1:4	1:8
±	0	0

Blood and spinal fluid precipitins hemolyzed

Conclusion: "It is uncertain whether the complement fixation is regressive from passive transferred humoral antibodies from the mother or whether the infant might have congenital infection—a condition which we have never seen."

Results of tests of blood and spinal fluid drawn from the white mother just before delivery were:

Complement Fixation

	Dilution							
	1:2	1:4	1:8	1:16	1:32	1:64	1:126	1:256
Serum	±	0	0	0	0	0	0	0
Spinal fld.	0	0	0	0	0	0	0	0

Precipitin Tests

	Serial Dilutions of Antigen		
	Undiluted	1:10	1:40
Serum	++++	0	0
Spinal fluid	0	0	0

The conclusion was: "We could not elicit complement fixation but precipitins were present. In all likelihood the extent of meningeal involvement is small."

Two months later results of spinal fluid complement fixation tests were positive up through 1:16

dilutions and the precipitins positive to 1:40 dilution.

Results of tests of blood drawn from the umbilical cord:

Complement Fixation							
Dilution							
1:2	1:4	1:8	1:16	1:32	1:64	1:128	1:256
+	0	0	0	0	0	0	0

Precipitin Tests		
Serial Dilutions of Antigen		
Undiluted	1:10	1:40
0	0	0

Conclusion: "Unfortunately, from the scientific point of view, the titer of the mother's blood is very low. The infant seems to have the same titer in the cord blood, but it is so low as to be of doubtful diagnostic significance."

One month later a second sample of the infant's blood was sent to Stanford for recheck. Tests of the new sample and of the specimen previously sent were done simultaneously.

	1:2	1:4	1:8	1:16	1:32	1:64	1:128	1:256
Previous specimen	++++	+	±	0	0	0	0	0
New specimen	±	0	0	0	0	0	0	0

Precipitin Tests			
Serial Dilutions of Antigen			
Undiluted	1:10	1:40	1:100
Hemolyzed			

Conclusion: "This test was slightly tighter and the second test of the previous specimen showed definitely positive reaction. However, the reaction to test of the new specimen was negative, suggesting that the passive transfer of humoral antibodies in cord blood had worn off. Certainly there was no evidence of congenital infection."

The results of coccidioidin skin tests were negative for both infants in dilutions of 1:100 and 1:10. The premature infant died and necropsy did not reveal coccidioidin infection. The placental tissue was also free of coccidioidin infection. The full term infant lived and when last heard of was doing well.

One of the authors³ reported coccidioidin infection in an infant, the youngest of record to have such infection. In that case swelling of a finger was noted in the second week of life, and a slight cough had been present from birth. The swelling was caused by coccidioidin dactylitis which was proved by culture and by examination of sections. In addition, a pulmonary cavity was noted. At 13½ months of age the child was observed again and the cavity seemed to be enlarging. A complement fixation test was positive for coccidioidin infection in a dilution of 1:128. The mother had had San Joaquin fever during pregnancy, but at that time the possibility of congenital infection had not been considered, so had not been investigated.

The authors did coccidioidin skin tests on 102 women immediately before or soon after they were

delivered of babies. One-half of the tests were done in the delivery room and the other half in the patients' rooms within the first 24 hours after delivery. The average length of time that these mothers had lived in the San Joaquin Valley was nine and three-quarters years. Among the 102 women tested, 48 (47 per cent) showed positive reaction.

With this result taken to indicate that there would be a comparable incidence of coccidioidin infection in other pregnant women in the area, routine coccidioidin skin tests were done on every newborn in the Kern General Hospital in the fall of 1948. The material used was in dilution of 1:100, and 0.1 cc. was injected intradermally into the right forearm. The reactions were observed 24, 48, and 72 hours later. (Smith's¹² rule was used for appraising the reactions.)

In all, 220 newborns were tested. In 110 cases the test material was injected within the first 24 hours after birth, and in the remaining 110 the injections were made in the second 24-hour period. Erythematous reactions were noted in 40 per cent of both groups 24 hours after injection, but at the end of 48 hours erythema had disappeared. In only one case in each group did induration persist for 48 hours after injection—a positive reaction. But in these two cases x-ray studies of the lungs disclosed no abnormality.

In an attempt to find the average earliest age at which infants and children might first show positive reaction to coccidioidin skin tests, skin tests were carried out on 312 children in the pediatric ward and 283 in the clinics, a total of 595, ranging in age from one month to 13 years. Results are shown in Table 1.

TABLE 1.—Positive Reaction According to Age Group Among 595 Children Tested with Coccidioidin

Age	Positive Reaction	
Months:	1	1
	2	1
	3	3
	5	1
	7	1
	9	1
	12	1
	13	1
	18	3
	24	5
	Total	18 * (3% of Total)
Years:	2-3	5
	3-4	7
	4-5	9
	5-6	12
	6-7	9
	7-8	11
	8-9	8
	9-10	11
	10-11	10
	11-12	11
	12-13	2
	Total, 2 to 13 years	95 * (15% of Total)

* Of the total of 113 children with positive reactions, 90 per cent had lived in Kern County all their lives.

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**Gentleman and Scholar**

On a recent visit to Goettingen, the seat of the venerable Georg-August University, I met the renowned pathologist, Gg. B. Gruber, who formerly held the chair of pathology at the university, and is now retired. He told me the following story: In April 1945, when the American troops entered Goettingen, an American medical officer entered the Pathological Institute looking for a place to billet his men. He examined every room in the Institute, and was attracted by the gallery of pictures of pathologists. When he noticed among these a picture of Rudolph Virchow, he said: "A house in which the picture of Rudolph Virchow hangs, whom we Americans admire not only as a scientist but also as a democrat, shall not be occupied by the military." He gave a brisk military salute, and left. The Pathological Institute of Goettingen remained unoccupied.

Robert Wartenberg, M.D.

Tracheotomy in Bulbar Poliomyelitis

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SUMMARY

Tracheotomy was performed on 181 of 351 patients with bulbar poliomyelitis. The essential indication for tracheotomy was secretional obstruction of the respiratory tract that could not be relieved by postural drainage and aspiration.

Comparison of mortality rates in this series with those of previous series in which tracheotomy was not done in the presence of similar indications, suggests that the procedure may be life-saving in a considerable percentage of cases.

Outside the respirator the tracheotomy can be done with or without the aid of the bronchoscope or endotracheal anesthesia tube. When done inside the opened respirator the Bennett flow-sensitive positive pressure machine should be used to supply oxygen to the patient while the respirator is not operating.

TRACHEOTOMY seems to have been used first in the treatment of poliomyelitis in 1931. Wilson¹¹ reported using it successfully at that time in a number of patients with pharyngeal paralysis in preventing choking attacks and aspiration of secretions into the bronchial tree. Davison³ in 1936 stated that tracheotomy might be necessary in bulbar poliomyelitis. Galloway⁴ in 1943 reported that tracheotomy was life-saving in two of three patients with poliomyelitis and respiratory difficulty not relieved by postural drainage or aspiration of secretions incapable of being swallowed. In 1945 Nelson-Jones⁸ and Williams reported the use of tracheotomy in one case of bulbar poliomyelitis and Glaser⁶ also reported its use in a small number of cases. During these years tracheotomy seems to have been used only in a relatively small number of patients and then only rather late in instances of severe secretional obstruction of the airway. However, in the 1946 epidemic in Minneapolis, Priest⁹ reported on the use of tracheotomy in 75 of approximately 400 cases of bulbar poliomyelitis. In this series tracheotomy was used not only as a lifesaving measure but as a prophylactic procedure to prevent anoxia, atelectasis and pneumonia. Of the 75 patients tracheotomized, 29 survived, and of these 19 seemed to owe their lives directly to tracheotomy.

As a result of the successes in that large series,

tracheotomy was performed on 14 of the 129 patients with bulbar poliomyelitis treated in the communicable disease unit of the Los Angeles County General Hospital during 1946. Seven of the 14 died. Eight tracheotomies were performed in 1947 and four of the patients died, but in the severe epidemic of 1948 more than 200 tracheotomies were performed in this hospital in a series of more than 600 patients with bulbar poliomyelitis.

During 1948 there were 3,135 cases of poliomyelitis in Los Angeles County with a mortality rate slightly over 4 per cent. The Los Angeles County health officer reported that there were 600 patients with the bulbar type of the disease; 280 of them required respirator care and 230 of them needed tracheotomy, making this the most serious as well as largest epidemic in the history of the country. The authors reviewed the records of 388 of the cases of bulbar poliomyelitis in this series. In this group 198 patients (51.0 per cent) received tracheotomy. Experiences and results in these cases form the basis for this presentation, which is made in an attempt to outline indications for and technique of performing tracheotomy in bulbar poliomyelitis.

INDICATIONS

Secretional obstruction of the respiratory tract is the outstanding indication for tracheotomy. Early in bulbar poliomyelitis, paralysis of the 9th and 10th cranial nerves results in secretions pooling in and obstructing the larynx because of the inability of the patient to swallow the secretions. Interference with the innervation of the larynx and increased secretions are additive factors. Early symptoms indicating bulbar poliomyelitis are a weak or nasal voice and difficulty in swallowing. It is of interest that a very large number of the patients in this series also had early unilateral facial paralysis. Of course, many times the pooled secretions can successfully be aspirated by suction, but when the patient, despite suction, has periods of choking in which he becomes restless, irritable, apprehensive, or slightly cyanotic, tracheotomy is indicated.

Sometimes the patient is already comatose and cyanotic when first observed, because the secretions in the larynx and upper trachea are so great and thick that air cannot be drawn through them. In such cases immediate tracheotomy often permits successful aspiration of the secretions with prompt recovery from anoxia.

In another classification are patients in whom pooling of secretions is insufficient to cause laryngeal obstruction but in whom there is clinical or x-ray evidence indicating development of atelectasis, pneumonia, or pulmonary edema as a result of abnormal amounts of secretion in the lower airways. This pooling of secretions in the trachea and bronchi may result from the inability to cough and the loss

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of tussive squeeze because of paralysis of the intercostal muscles and the diaphragm. Furthermore, pulmonary edema and bronchial hypersecretion are a part of poliomyelitis. The development of this situation is an indication for early tracheotomy in order that the tracheobronchial tree may be kept aspirated free of secretions.

Tracheotomy is frequently indicated for the patient who is already in a respirator, because the negative pressure created by the respirator in its inspiratory phase tends to pull the secretions downward from the larynx and thus cause atelectasis or "drowning in the patient's own secretions." The intrathoracic negative pressure is increased on inspiration by any obstruction at the laryngeal level either because of pooled secretions or vocal cord paralysis. Thus tracheotomy is indicated to afford safe aspiration of these secretions and to by-pass the laryngeal obstruction causing the increasing negative inspiratory pressure.

Because of this action by the respirator, in the past many patients with bulbar poliomyelitis who developed respiratory difficulty because of intercostal and diaphragmatic paralysis could not survive if placed in the respirator. Here, then, is another indication for tracheotomy; that is, in the patient with bulbar poliomyelitis who up to a point has not been distressed by secretions, but who ultimately must be placed in a respirator.

TECHNIQUE

Tracheotomy for a patient with bulbar poliomyelitis is a complicated procedure if the patient is already in a respirator or if it is necessary that he be placed in a respirator immediately following this operation. Of 198 tracheotomies in the present series, 140 were done outside the respirator. Fourteen were done in an opened respirator, with an endotracheal anesthesia tube supplying oxygen from a manually operated anesthesia bag. The other 44 operations were performed in the opened respirator with a Bennett flow-sensitive positive pressure machine being substituted for breathing.

If the patient has never been in a respirator, tracheotomy is performed in the usual manner over a bronchoscope. Especially should the bronchoscope be used if the patient is a child. This technique should be used in most prophylactic or early tracheotomies.

If the tracheotomy is performed outside the respirator upon a patient who is to be placed in the machine immediately afterwards, the operation should be done over an endotracheal anesthesia tube or with the Bennett flow-sensitive positive pressure machine and mask supplying oxygen until the respirator can take over.

If the patient is already in a respirator and cannot breathe well enough or long enough to permit carrying out tracheotomy with the respirator turned off and opened up, the following techniques utilizing the Bennett positive pressure machine seem to be best:

1. Using the positive pressure mask, the patient

can be pulled far down into the opened respirator but with the head still outside. With this technique, after tracheotomy the neck must be pulled up through the collar and the respirator closed and turned on as soon as the trachea is opened.

2. The patient's body, including the head, may be pulled down inside the opened respirator and the positive pressure mask applied through the collar opening of the respirator. As soon as the trachea is opened the positive pressure machine mask is removed and the oxygen tube attached directly to the tracheotomy tube and positive pressure continued. The patient's head and neck may then be drawn through the collar opening. This method seemed better to the authors and was the standard technique used in performing tracheotomies during the last part of the epidemic. Three strips of 3-inch flannel "soft restraint" material were used to roll the rubber collar of the respirator outward.

If the positive pressure machine did not keep the patient pink, the endotracheal anesthesia tube and oxygen breathing bag were substituted for it. This was occasionally necessary for patients with vocal cord paralysis or with acute laryngeal spasm.

The incision into the trachea itself should always be placed rather high in order to facilitate changing and cleaning of the tracheotomy tube and dressing the tracheotomy wound. The ideal site, in the authors' opinion, is the second tracheal ring. This ring almost always lies beneath the thyroid isthmus. Therefore, severance of the isthmus always should be planned. It was noted many times that the isthmus was swollen and congested.

A metal flange constructed to hold the rubber collar down and away from the tracheotomy wound makes care of the wound easier. Attempts to perform the tracheotomy outside the closed respirator with this flange in place were uniformly unsatisfactory, difficult and dangerous.

The tracheotomy tube used should be of the largest possible size, for two reasons: (1) in order that secretions may flow easily and without crusting, (2) to minimize the possibility that the tube might itself have the effect of tracheal obstruction and thus cause increased intrathoracic negative pressure during the inspiratory phase of the respirator.

POSTOPERATIVE CARE

Complete, detailed discussion of postoperative management of the tracheotomized patient in a respirator has been presented by West and Bower.¹⁰ The respirator may be tipped head down for short intervals. Gentle suction with small rubber catheters with multiple openings is used through the tracheotomy tube to keep the airway cleared of secretion. Should the patient become cyanotic despite this suctioning, bronchoscopy through the tracheotomy is performed, repeatedly if necessary. Oxygen, bubbled through cool water, is allowed to flow into the tracheotomy tube at a rate of 2 to 3 liters per minute. Fluids are given at first intravenously and later by Levine tube into the gastrointestinal tract.

AUXILIARY POSITIVE PRESSURE MACHINE

Early in the epidemic the attending and resident staff of the communicable disease service noted that many of the tracheotomized respirator patients did not do as well as expected. That is, they did not seem to get enough air on inspiration, and repeated aspiration through the tracheotomy tube and even bronchoscopic aspiration did not control the presence of excessive secretion in the tracheobronchial tree. Thus atelectasis, pneumonia or pulmonary edema often resulted, sometimes causing death. It was theorized that in the tracheotomized patient the respirator did not create inspiratory aeration sufficient to combat the edema and hypersecretion present. Presented with the problem, a consulting engineer devised and built a machine which delivered air, oxygen or gaseous mixtures under positive pressure during inspiration through the tracheotomy tube.

Other investigators (Glaser,⁶ Baker,¹ and Kubicek⁷) have described the use of oxygen under positive pressure during expiration, but clinical observation and a lessened mortality rate after the Bennett² positive pressure machine was routinely used proved the advantages of giving oxygen under positive pressure during inspiration, both in preventing hypoxia and in reducing bronchial secretions. The machine is so designed that on each expiration it is turned off so that the patient does not exhale against pressure. This mechanism is attached directly to the respirator so that its bellows contract as the respirator bellows expand; that is, positive pressure is applied through the tracheotomy tube during the inspiratory phase of respirator action. A portable flow-sensitive Bennett positive pressure machine with either face mask or an attachment for the tracheotomy tube was also constructed. This machine has an expiratory phase also, in which negative pressure is produced in the mask. It differs from other resuscitators, in that it is "flow-sensitive," that is, it cuts off automatically when the patient breathes for himself. This machine was used to breathe for the patient while the respirator was open and turned off to permit the placing of a tracheotomy tube.

RESULTS

Mortality: In the total of 388 cases of bulbar poliomyelitis reviewed, there were 101 deaths—28.8 per cent. Seventy-seven of these deaths were in the group of 198 patients who received tracheotomy. Thus there was a 38.8 per cent mortality rate in the tracheotomized group.

Complications: In the 198 tracheotomized patients there was one case of mediastinal emphysema and two cases of pneumothorax. There was troublesome bleeding from the tracheotomy wound in three patients, one of whom was receiving heparin.

Decanulization: The tracheotomy tube was usually not removed until the patient could swallow adequately. The average time for the return of adequate swallowing was 21½ days. The longest time

for the return of swallowing and thus the removal of the tracheotomy tube was four and one-half months. However, many patients had a return of swallowing the day following the placing of the tube.

Stenosis: There was no instance of laryngeal stenosis occurring in this group of patients.

COMMENT

The total mortality rate of 28.8 per cent in this series of 388 cases of bulbar poliomyelitis seems gratifyingly small when compared to mortality rates in bulbar poliomyelitis in other epidemics. Inasmuch as in this epidemic tracheotomy was performed in 198 cases or 51.0 per cent of the patients with bulbar poliomyelitis, and since this procedure was the only major way in which treatment differs in this and previous epidemics, it is believed that early tracheotomy performed upon the previously mentioned indications was a great factor in lowering the death rate. Certainly those who performed the tracheotomies were convinced that many of the patients would have died of anoxia, atelectasis, pulmonary edema, or pneumonia if tracheotomy had not been done.

The staff members who were in constant attendance on these patients had a much better opportunity than the otolaryngologist to evaluate tracheotomy. Not only were they sure of its life-saving value, but almost all of the tracheotomies were done at their request upon their evaluation of the indications present. Two of the staff who saw all the cases (Bower and West) concluded that early tracheotomy cannot be over-stressed in the management of acute bulbar poliomyelitis and that this treatment saved at least half of the patients of a type who previously died.

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Surgical Management of the Injured Large Bowel

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SUMMARY

Many of the observations made in the management of large bowel injuries during World War II are applicable to similar cases encountered in civilian practice.

Early administration of whole blood to combat shock cannot be overemphasized.

The patient should be adequately examined for associated injuries.

Ether-oxygen is the anesthetic agent of choice, and a closed technique should be used.

Vertical incision offers the best exposure for the operation and is most rapidly performed.

The surgical principles of exteriorization and/or a proximal colostomy to completely divert the fecal stream are the important features in the technical management of the injured large bowel.

A method of colostomy closure is presented.

EXPERIENCES gained in the last war have served to crystallize current knowledge of the surgical management of the injured large bowel. The present surgical concept in the management of patients with such injuries comprises proper treatment of shock, which is present in most cases, adequate postoperative care with judicious use of chemotherapeutic and antibiotic agents, and the employment of the surgical principle of exteriorization of the injured segment of bowel.⁶ Comparison of mortality rates in the first World War with those of the second gives a striking example of the effectiveness of this course of management. Penetrating wounds of the colon in World War I caused death in 45 per cent of cases. In World War II, in which many of the wounds were caused by more destructive missiles, the mortality rate was between 15 and 20 per cent.⁷

Preoperative Management. Intra-abdominal injuries due to penetrating or perforating wounds almost always are attended by shock of various degrees. This must be combated early. While plasma is beneficial, whole blood is far more efficacious. Certainly if there is continuing hemorrhage or advancing peritonitis, satisfactory response to blood transfusions is not obtained, and the surgeon is forced to proceed with the operation.⁵ He must then rely on support of the patient by transfusions during and after operation. The blood pressure of the

patient, although one of the least valuable gauges of impending shock, is one that is frequently used for that purpose. A far more reliable guide is hematocrit measurement, for hemoconcentration occurs before the fall of blood pressure and is thus an earlier index of impending shock.

Nasogastric intubation, with removal of gastric contents, is an important measure to prevent the aspiration of this material during anesthesia. If passage of the tube provokes vomiting, that is fortunate. Testing of the nerve function of the extremities, and a rectal examination to determine the presence of fresh blood, indicative of injury to the rectum, are two of the most commonly overlooked procedures in the preoperative examination.

Anesthesia. Ether-oxygen for anesthesia, with a closed system and preferably use of an intratracheal tube, is the method of choice. Supplemental block of the field either by local infiltration or the injection of the lower intercostal nerves in the axillary line may minimize the necessity for carrying the patient into the deeper levels of anesthesia.⁶ Facilities should be available for bronchoscopy if there is reason to believe that gastric contents may have been aspirated into the tracheobronchial tree. Postoperative pneumonia caused by aspiration of such material ranks with peritonitis as a life-endangering complication.

Incisions. In the acute case, the vertical paramedian incision affords the most useful approach and is least liable to complications. Fecal contamination of the peritoneal cavity is usually reflected by postoperative infection of the abdominal wall.⁴ When conditions permit, it is preferable to close the peritoneum and posterior rectus sheath in one suture line. The remainder of the abdominal wall is loosely approximated, preferably with stay sutures of braided silk, cotton, or wire. The skin is left unsutured. The provision of adequate drainage of the abdominal wall incision, the avoidance of buried sutures and ligatures, and a loose rather than taut approximation of the stay sutures, are the most effective measures in the prevention of infection and postoperative hernia. While incisional hernias are not within the scope of this presentation, these were observed frequently when wounds broke down because of improper suture. Therefore abdominal closure without the use of buried catgut sutures should be emphasized. The meticulously closed abdominal incision, while cosmetically pleasing, is fraught with danger of sepsis of the wound and subsequent dehiscence.

When it is necessary to exteriorize segments of bowel or to provide intraperitoneal drainage for, or in anticipation of, localized sepsis or a fecal fistula,

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secondary incisions are made. These are short, laterally placed incisions that follow the direction of the fibers of the external oblique muscle.⁴ In the upper abdomen, incisions for the exteriorization of bowel must not impinge on the costal arch, for that would make closure difficult.

Management of the Injured Colon. One of the great contributions to surgical management of the injured large bowel has been the recognition of the fact that perforations of the large bowel should not be sutured primarily, but rather that the segment of bowel should be exteriorized or the fecal stream diverted by proximal colostomy. This principle is in contrast to injuries of the small bowel. Its strict application during the war resulted in the saving of many lives. It is important, however, to note the distinction between exteriorization of a wounded segment of bowel, and colostomy to divert the fecal stream. At times both purposes may be accomplished by one and the same procedure, but a clear understanding of the purpose of the operation is essential to the selection of the techniques involved. For either purpose, the basic technical requirement is adequate mobilization of the segment of the large bowel that is brought to the surface of the abdominal wall. Sufficient mobilization is not always easy in the fixed portions of the colon or in the flexures or rectosigmoid region. But insufficient mobilization, with dependence upon sutures or clamps to maintain the bowel in its abnormal position, frequently results in retraction. This leads to a fecal fistula that may be difficult to repair, or, in the case of an improperly functioning colostomy, defeats the purpose of the operation by allowing fecal matter to enter the distal segment. Early in convalescence, retraction of the bowel may result in life-endangering abdominal wall infections, or intraperitoneal sepsis.

Exteriorization. Exteriorization of the damaged segment through a laterally placed muscle-splitting incision is the established procedure in the management of wounds of the large intestine.⁴ The loop of bowel must lie comfortably on the abdominal wall without tension and with proper orientation of its proximal and distal limbs—that is, not twisted on itself. When the limbs are twisted, the application of a spur crushing clamp may endanger the blood supply in the subtending mesentery. When the bowel is properly exteriorized, the mesentery falls naturally into a fold on the medial aspect of the loop, leaving the bowel walls in contact on the lateral side.

In cases in which the injury is larger than one-half of the diameter of the bowel, or a segment has to be resected because of damage done to the mesentery, exteriorization takes the form of a double-barreled spur. Sutures may be placed to approximate the antimesenteric borders of the intraperitoneal portions of the limbs for subsequent crushing by a clamp. Care must be taken not to penetrate the lumen of the intestine or to strangulate the vessels by suture.

Sigmoid Colostomy is required to divert the fecal stream in cases of injury to the pelvic colon below the level at which exteriorization is possible.⁵ If the perforation is at a point so low as to make it impossible to exteriorize the bowel, the perforation is repaired by suture and a proximal colostomy is performed. Sigmoid colostomy is, therefore, indicated in wounds of the rectum and in certain perineal and buttocks wounds as an aid to wound healing and secondary suture. Such wounds are frequently contaminated. A tube colostomy or cecostomy does not divert the fecal stream from the remainder of the colon and should therefore not be used. Colostomy in the left half of the transverse colon is a useful procedure in the presence of extensive pelvic injuries that require subsequent repair by the abdominal route. This is particularly true if a suprapubic cystostomy is also indicated, or if there is also extensive damage to the left lower quadrant of the abdomen. Placement of the colostomy in the laparotomy incision or in a defect produced by the missile causing the wound is to be avoided, because all too frequently this results in infected incisions and hernias. Formation of a loop with proper orientation of the bowel provides an adequate sigmoid colostomy. Formal construction of a long spur is not necessary and actually may be undesirable. Extensive damage to the lower bowel segment, associated injury to the bladder and urethra, wounds that extensively compound the bony pelvis, and injuries to the rectum, are examples of injuries that require a prolonged and completely functioning artificial anus. Here the loop must be made sufficiently long to allow for complete transverse section of the bowel and some separation of the two stomata. As ultimate closure will be by end-to-end suture, formation of a spur is not desirable.

Cecostomy. Tangential perforations of the cecum are best managed by exteriorization. Single perforations require mobilization of the bowel in a search for retroperitoneal perforations. Cecostomy, even when necessary because of direct injury to the cecum, should not be employed as a substitute for proximal colostomy when the indications for the latter are present.

Right Colostomy. In extensive injuries necessitating resection of the cecum, the most important principle to observe is complete separation of the ileostomy from the laparotomy incision or from a large abdominal wall defect. The most satisfactory method for dealing with the end ileostomy is a separation of the ileum from the proximal end of the colon by creating a terminal ileostomy in a separate incision in the right lower quadrant and exteriorization of the end of the colon below the costal margin. Every effort should be directed toward the early anastomosis of the ileum to the transverse colon.²

Perforation of the Rectum. Wounds of the rectum are characterized by inaccessibility, difficulty of diagnosis, frequent associated damage to other

structures, and the hazard of pelvic and ascending retroperitoneal cellulitis. Deviations from the principles established for the management of wounds of the rectum lead to serious complications. Colostomy (not cecostomy) is mandatory. Colostomy should completely divert the fecal stream, and usually should be located in the sigmoid colon. Free posterior drainage must be obtained. This is best established by incision of the fascia propria, thus exposing the rectal, sacral, and paramedian spaces. Attempts to drain the retroperitoneal space through a wound of the buttocks have usually met with disaster. In establishing posterior drainage, it may be desirable to increase the exposure by removal of the coccyx. This is done as a disarticulation of the coccyx by sharp dissection and erasure of the exposed articulating cartilage, and not by incomplete amputations with bone forceps.⁵

Postoperative Care. Complete and adequate postoperative care of the critically wounded patients is vital.⁶ Briefly, (1) nasogastric suction, (2) the administration of whole blood and plasma, (3) parenteral fluid therapy in quantities large enough to insure a 24-hour output of 1,200 to 1,500 cc., (4) aspiration of tracheobronchial secretions to prevent postoperative atelectasis and pneumonia, and, (5) the use of chemotherapeutic and antibiotic agents. The latter in the form of penicillin and streptomycin, both intraperitoneally and parenterally, are apparently standing the test of time.

Closure of Colostomy. The author has evolved certain principles to follow in the closure of colostomies:

(1) An inadequately functioning colostomy deteriorates into a useless fecal fistula when it no longer diverts the fecal stream. It should be either closed or reestablished as an effective artificial anus, depending upon the conditions of the bowel below it.

(2) Whenever feasible, spur crushing clamps should be applied. Care in this procedure must be exercised to make sure that the mesentery is not between the two limbs of the bowel, and that the limbs are not rotated.

(3) Extraperitoneal closure of colostomy has proved to be best, in the author's experience. (In only a few instances was it necessary to carry out a formidable intraperitoneal end-to-end suture.) The bowel is freed down to the peritoneum and, after closure, is placed in the extraperitoneal space. Closure of the abdominal wall over the bowel is effected with cotton sutures. Postoperative x-ray studies of the colon with barium enemas have given no evidence of obstruction. In those instances in which after closure of the colostomy the lumen appears to be inadequate, it is supplemented with small side-to-side anastomosis between the proximal and distal limbs.

4. The author has not hesitated to repair large incisional hernias at the same time that the colostomy was closed. Cotton sutures or fascial transplants are employed. Keene³ is of the opinion that the primary intraperitoneal end-to-end closure of the colostomy affords the best postoperative results.³ The author has not found it necessary to employ the more formidable procedure.

Although sulfasuxidine or sulfathalidine is used preoperatively, sulfanilamide crystals locally in the wound were found to be completely ineffective and were discarded early. Penicillin and streptomycin are effective and are used intraperitoneally and parenterally.

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Alcoholism

Studies by a Special Committee of the California Medical Association

- I. INTRODUCTION—Project of appointed committee to include the preliminary study of alcoholism in the State of California with view to collation of information and data and presentation of recommendations to the physician and to the Council for ways and means of meeting this problem.
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 7. Financing the program
 8. Conclusions

* * *

To: *The Council of the California Medical Association:*

INTRODUCTION

THIS committee has been appointed by the President of the California Medical Association to collate information and basic data for consideration and evaluation in meeting the problem of alcoholism in California. The committee considers its object should include: (1) The provision of detailed information to the physician, designed to (a) acquaint him with the nature and extent of, and current practices in handling, the problem; and (b) influence his attitude in the care of alcoholic patients and toward his approach to the problem as a leading citizen of the community. (2) The provision of a statement of services, facilities and programs needed to attack the problem. Such a statement may serve as a guide to the California Medical Association in its official approach to the problem and as a guide to its members in their approach to the problem in their communities. (3) Recommendations for the implementation of the program.

This committee shall not engage in any activities designated to promote or prevent the sale or consumption of alcoholic beverages.

A study of the problem in California with a view to making suggestions to the California Medical Association and its members in meeting the problem and aiding the addict.

Aspects of the Problem

1. Brief History of Alcohol Use:

Strecker and Ebaugh state that the history of alcohol is coexistent with the history of the human race. Tablets of great antiquity indicate that the Egyptians and other ancient peoples enjoyed beer. Rome was drunk not only upon its military victories but also upon its wines. The barbarians from the North brewed a delectable beverage from cereals and honey called mead. The Caledonians produced Scotch whiskey. The North American Indian concocted a potent beverage from the gall of elk and buffalo which was exposed to the heat of the sun.

Any human habit which persists through the ages, surviving legislative and other efforts to eradicate it, must be motivated by a powerful driving force. The reason that the use of alcohol by man has persisted through the centuries is that it has the quality of blurring the hard, unpleasant and forbidding outlines of reality, and if taken in sufficient quantities, it has the power to efface reality. It is fantasy in a bottle. It is readily obtainable, produces its effects quickly, and for a long time its devotees escape social stigma. Alcohol is a tremendous economic, social, ethical and medical problem.

No country has, as yet, succeeded in working out a solution for alcoholism, despite many sincere and determined efforts. The Jews, living with all other racial groups, seem to be the only group that is almost free from pathologic alcoholism. Their close-knit family and social ties and their dietary restrictions perhaps partially account for this.

The trend of alcoholism is indicated by state hospital statistics of the past 40 years. Early in this century an active educational program disseminated information through newspapers, magazines and school textbooks, concerning the effects of alcohol on the human body and its functions, with some beneficial results. The incidence of alcoholic psychoses among first admissions to the New York State hospitals was reduced from 6.4 per 100,000 total population in 1910 to 1.2 per 100,000 of population in 1920 (the lowest figure on record for that state), during the application of "local option" which resulted in 40 per cent of the population living in "dry" territory.

National Prohibition was accompanied by a steady increase in the incidence of alcoholic psychoses until in 1932 the figure for New York reached 4.5 per 100,000 of total population. Repeal of the Eighteenth Amendment was followed by a further rise in the incidence of alcoholic psychoses, exceeding the rate of 30 years ago.

The Eighteenth Amendment was proposed December 18, 1917. On January 29, 1919, the United States Secretary of State proclaimed its adoption by 36 states and declared it in effect on January 16, 1920. The total vote in senates of the various states was 1,310 for, 237 against—84.6 per cent dry. In the lower houses of the states the vote was 3,782 for, 1,035 against—78.5 per cent dry. The amendment

was adopted by all the states except Connecticut and Rhode Island.

Article Twenty-one (Repeal of the Eighteenth Amendment to the Constitution) was proposed in the Senate January 16, 1933, and in the House of Representatives February 20, 1933. It went into effect December 5, 1933, having been adopted by 38 of the 48 states.

2. Brief Survey of the Industry:

The Federal Trade Commission, in 1941, as part of its Industrial Corporation Reports, presented an analysis of financial operations of six of the "more important concerns" in the distilled liquor industry. Their total sales in 1939 were valued at \$290,699,253; net income after taxes was \$17,083,626; dividends paid totaled \$1,126,333 on preferred shares of stock and \$6,253,776 on common shares—equivalent to 4.9 per cent of the "equity value" of \$150,646,987 of the six corporations. These six producers spent for advertising an amount equivalent to 4.8 per cent of sales, or \$13,984,494.

The Federal Trade Commission also reported on 21 of the "more important" corporations manufacturing malt beverages—those having about 44.4 per cent of the total value of all products as given in the 1940 Census of Manufacturers for 1939. Their sales in 1939 amounted to \$203,496,279; net income after taxes was \$23,732,813; dividends paid were \$1,069,821 on preferred shares, \$12,011,120 on common, equivalent to 10.4 per cent of the equity value of \$125,763,115. Expenditures for advertising totaled \$14,157,477, equal to 6.94 per cent of total sales.

The Securities and Exchange Commission reported "data on profits and operations" of certain corporations whose stocks were listed on exchanges in 1940. For distillers, ten corporations were listed, having total sales of \$349,965,000 in 1940; their net profits after taxes were \$24,617,000, an amount equal to seven per cent of net worth.

The SEC reported in 1940 on five distillery corporations in the United States with assets of over \$10,000,000 each on June 30, 1939. These owned the major portion of the total assets of the 15 corporations of this industry that had registered securities. The total value of the sales of these five corporations was \$308,000,000 in the year ending in 1939. Their profits, after all charges, were \$23,100,000, or 7.5 per cent of sales. They paid dividends of \$12,800,000 in the year ending in 1939.

The SEC presented data for 27 breweries with listed stocks for 1940. Their total sales were \$78,489,000; the net profits after taxes were \$7,503,000, which was equal to 9.6 per cent of sales and 11.8 per cent of net worth.

As to distribution, the most recent figures are for 1939, appearing in the 1940 Census of Distribution. In that Census there were reported 135,594 "drinking places," that is, places primarily so operating, such as bars, beer gardens, cabarets, night clubs, saloons, tap-rooms, taverns. Their total sales were reported as \$1,385,032,000 or 3.3 per cent of

all retail sales for all purposes reported in the Census. (Meals are also served at an undesignated portion of these "drinking places.") Their total payroll was \$159,689,900 for 212,235 employees, and there were enumerated 136,217 "active proprietors of unincorporated businesses."

For retail liquor stores selling packaged goods, there were reported 19,136 outlets, with \$586,351,000 in sales, 25,676 employees, and a payroll of \$30,782,000. Their total sales were 1.4 per cent of all retail business reported in the nation for that year. Alcoholic beverages were also sold to some extent at establishments listed primarily as "eating places," which numbered 169,792; and at food stores, which totaled 560,549.

The most inclusive report of advertising expenditure was made for 1940 by the Bureau of Advertising of the American Newspaper Publishers' Association. The total spent by national advertisers in 1940 was \$420,479,424. Expenditure for advertising alcoholic beverages was \$19,533,136, being third on the list and exceeded only by automobile and grocery advertising.

Printers' Ink published an item in 1942 to the effect that the brewing industry alone had spent \$170,000,000 for advertising since 1933. The estimated total expenditure for advertising in 1940 by the brewing industry was \$21,058,000.

The United States Department of Commerce and Graphics Institute report spending habits in the United States in percentage of national income as follows: 4.90 per cent (8.8 billion) is spent on alcoholic beverages, 3.40 per cent (6 billion) for horse race betting, 1.90 per cent (3.4 billion) for tobacco and cigarettes, 0.85 per cent (1.5 billion) given to religious and social welfare, and 10.5 per cent (18.7 billion) for individual United States income taxes. The common estimate of expense for public education in the United States is given as 3.3 per cent—about two-thirds as much as is spent for alcoholic beverages.

In February, 1944, the Department of Commerce published estimates of the total value of alcoholic beverages purchased by people of the United States from 1934 to 1943. The amount estimated for 1940 was \$3,595,000,000. For the 131,669,275 resident population of the United States in 1940 this equals \$27 plus per capita. For 1934, \$2,300,000,000 was spent, and for 1943, \$6,830,000,000. The 1934-43 expenditures were equal to 4 to 5 per cent of total income of all the people. For approximately 44,000,000 users of alcoholic beverages the annual outlay averaged about \$81 per person.

According to the 1939 United States survey, the manufacture of alcoholic beverages made use of about 3.2 per cent of the total volume of the corn, barley, rice and rye crops and about 60 per cent of the grapes grown commercially. The five branches of alcoholic beverage manufacture totaled 1,241 establishments with 76,585 employees, with a total payroll of \$145,464,387. The total wholesale value of manufactured products was \$722,561,399.

ALCOHOLIC BEVERAGE INDUSTRY IN CALIFORNIA

The figures in the following table provide an estimate of the dollar value of wholesale and retail distribution of alcoholic beverages in California for 1947 as provided by Arthur H. Samish and associates:

	Wholesale	Retail	Total
Number of premises	905	40,817	41,722
Number of employees	12,503	58,692	71,195
Excise, federal and state taxes, sales taxes and license fees			\$227,541,601
Wages and salaries paid	\$37,510,209	\$176,075,935	213,586,144
Moneys paid to other industries	23,557,791	104,096,104	127,653,895
Total	\$61,068,000	\$280,172,039	\$568,781,640
Capital investment	88,655,307	306,127,500	394,782,807

The Wine Institute has provided the following estimates of the economics of the wine industries of California:

Estimated investments in vineyards, wineries, real property and improvements	\$500,000,000
Estimated employment in vineyards and wineries year around	61,000
Estimated total employment in vineyards and wineries at vintage season peak	111,000
Estimated total annual payroll for grape and wine production (year around and seasonal)	\$157,000,000
Estimated state and county taxes collected from industry annually as direct taxes, exclusive of income taxes, sales taxes, etc.	2,000,000
Estimated amount of direct taxes collected annually on California wines by Federal Government	70,000,000
Estimated annual purchases of materials (not including grapes), supplies, equipment, services by California wineries and vineyards	75,000,000

These annual estimated purchases of supplies and services include the following:

Glass containers	\$20,000,000
Closures	2,000,000
Labels and other printing and lithography	1,800,000
Winery equipment	5,000,000
Winery construction	5,000,000
Transportation	10,000,000
Advertising	10,000,000
Vineyard supplies	5,000,000

Arthur H. Samish and associates have provided the following additional estimates of distilleries and breweries, and of wineries, storerooms, etc., in California:

"There are only four small distilleries in the State of California which do little business and employ about 55 people.

"There are nineteen breweries in California. They employ around 5,000 and have a value in capital of around \$100,000,000. California is eighth among state productions of beer, last year paying tax of \$8.00 a barrel to the Federal Government and 62 cents a barrel to the state on 4,500,000 barrels of beer. In producing this amount of beer the breweries used \$25,031,000 worth of agricultural products. The breweries spend several million dollars

annually in advertising. In addition they maintain huge fleets of trucks, are heavy users of transportation facilities, and market their supplies through about 40,000 retail outlets such as grocers, bars, hotels, restaurants and package liquor stores.

"There are 418 bonded wineries and storerooms, and estimated capital invested in vineyards, wineries and real property with improvements, equipment and inventories is \$500,000,000; land planted to vineyards, 557,000 acres; annual grape production, 2,895,000 tons; annual farm value of grapes, \$183,484,000; annual winery grape crush, 1,308,941 tons; annual gross wine production, 140,824,500 gallons; annual value of wine production, \$144,469,000; winery storage capacity, 285,500,000 gallons; annual wine inventories, 184,996,000 gallons; annual winery value of wine inventories, \$165,913,000; year-round employment in vineyards and wineries 60,000 persons; annual payroll of employees in vineyards and wineries, \$125,000,000; annual taxes, \$75,000,000."

It will be noted that these latter figures are closely in agreement with those provided by the Wine Institute.

These estimates indicate that the total capital investment in all phases of the alcoholic beverage industry in California probably exceeds a billion dollars. The total annual payroll approaches a half billion dollars, and taxes are well in excess of a quarter billion dollars. The industry is important in California.

3. Economic Loss and Cost of Alcoholism:

(a) *Loss of wages, absenteeism:* In 1940 loss of earnings by those who drink to excess in the United States was \$1,500,000,000, or equal to \$30 per person per year.

It is estimated that 70,000 men pass in and out of county and local jails in the United States each day. It is proper to assume a potential wage loss of \$1,116 for each of these 70,000; that is, \$78,120,000. The National Safety Council assigned \$1,800,000 as the potential wage loss of persons involved in accidents due to inebriety; 6.6 per cent wage loss in this group equals \$118,800,000. Inebriety was an important contributory factor leading to imprisonment in 19.6 per cent or 32,340 of the total of 165,000 Federal and state prisoners. Of prisoners released in 1940, 5 per cent were females. It may be estimated that 1,617 females had an average wage loss of \$656 or \$1,600,000, and 30,723 males an average wage loss of \$1,116 or \$34,288,000, a total of \$35,348,000.

A study of absenteeism in three Connecticut cities in 1942 revealed that in one factory of 18,000 employees, 2.7 per cent lost time on one or more occasions because of acute alcoholic intoxication. In another establishment of 20,000 employees, 4 per cent lost time for this cause. At Yale Plan clinics it was found that inebriate factory workers lost an average of three work days per month or 36 days per year. The average of several surveys of 2,400,

000 inebriates in 1940 indicated 624,000 were industrial workers. Applying the 36-day-per-year loss to the median annual earnings of \$1,116, wage loss from alcoholism in 1940 can be estimated at \$69,632,000. The total potential wage loss of the groups considered was \$442,960,000.

According to the Yale Clinic Studies, expenditures due to inebriety in 1940 throughout the United States were \$347,017,000 and potential wage loss \$431,886,000, giving a grand total of \$778,903,000.

(b) *Cost of alcoholics' care in jails and hospitals:* Of individuals hospitalized in the United States with mental illnesses of all types, 86 per cent were in state hospitals in 1940. Of those with alcoholic psychoses, however, only 72 per cent were cared for in state hospitals, 19 per cent in private hospitals, and the remaining 9 per cent in veterans', city and county hospitals.

Inebriate patients with psychosis in New York mental hospitals in 1940 numbered 4,845; without psychosis, 7,142. The estimated daily number of alcoholic patients in mental hospitals in the United States in 1940 with psychosis was 13,400, and without psychosis was 2,900. The per patient average cost in 1940 was \$261.50 in state hospitals, in veterans', city and county hospitals \$30 higher; and in private hospitals it was \$30 to \$100 per week, averaging \$50 weekly or \$2,600 yearly. The total cost in mental hospitals was \$13,000,000 for an average daily number of 16,300 patients.

Statistics indicate inebriety to be a contributory factor in 18 per cent of all charity cases.

A report by R. S. Binay (*Quarterly Study of Alcohol*, 3:686-716, 1942), states that of 1,576 first admissions to Sing Sing in 1938-9, and of 1,539 in 1939-40, alcoholism was closely related to the commission of the crime in 22 per cent of the prisoners.

4. Incidence of the Role of Alcoholism in:

(a) *Fatal and non-fatal automobile accidents in the United States, state, county and cities:* No quantitative estimate of the role of alcohol in traffic accidents has been made, but guesses on the contribution of inebriety vary from 5 to 75 per cent. For 1940 the National Safety Council reported that the driver or pedestrian had been drinking in 20 per cent of fatal accidents.

Fifty-seven cities with over 10,000 population use alcohol tests in traffic accidents. A number of local surveys in 1937-8 showed 13 to 31 per cent of drivers involved in accidents had sufficiently high blood alcoholic concentrations to indicate that they were intoxicated. In 1940 the National Safety Council reported 850,000 non-fatal motor accidents with 1,200,000 injuries and 5,200,000 motor accidents with property damage. The Council reports "five to ten per cent" of all traffic accidents were due to alcohol.

The National Security Council estimated the cost

of all accidents in the United States for the year 1940 as follows:

	National Council Estimate (mil- lions of dollars)	Estimate adjusted for Age (mil- lions of dollars)
Medical expense	300	257
Overhead cost of insurance	300	294
Property damage (motor vehicles)	800	800
Wage loss	1,800	1,800
Total	3,200	3,151

The Annual Statistical Report for 1948 of the Department of California Highway Patrol, which does not include accident reports of cities, lists "had been drinking" (HBD) drivers and pedestrians involved in California fatal and injury motor vehicle accidents from 1936 to 1947 inclusive, as shown in Table A.

Arrests by the Department of California Highway Patrol for driving while intoxicated:

Year	Arrests	Year	Arrests
1936	4,974	1942	7,972
1937	5,413	1943	4,765
1938	6,718	1944	4,027
1939	6,058	1945	4,642
1940	7,346	1946	6,484
1941	8,870	1947	7,181

The rural accidents in the State of California involving drivers who had been drinking in 1947 totaled 4,772, of which 384 resulted in fatal and 4,388 in non-fatal injuries.

The District Attorney's office of Los Angeles County estimates there are 10,000 arrests per month of alcoholics and vagrants (who are usually released in a few hours) at a cost of \$20 for each arrest. This cost of two and a half million dollars per year can be attributed directly to chronic alcoholism.

Jail bookings and sheriff's arrests in Los Angeles County for "Drunk, Drunk Driving, and Liquor Law Violations" as well as the total bookings and arrests for the fiscal years 1937-38 to 1947-48 are shown in Tables B and C.

The pronounced increase in jail bookings since 1944-45 is not due entirely to an increased number of persons being taken into custody. It is particularly due to a change in policy whereby the Los

TABLE B.—Los Angeles County Jail Bookings

Year	Total Bookings	Drunk	Drunk Driving	Liquor Laws
1937-38	21,816	5,100	1,816	135
1938-39	21,153	4,807	2,055	137
1939-40	22,046	4,908	1,667	131
1940-41	23,261	5,303	2,113	70
1941-42	23,788	5,187	2,071	87
1942-43	19,993	4,283	1,433	68
1943-44	20,250	3,444	1,042	38
1944-45	21,537	4,379	1,114	34
1945-46	26,266	5,570	1,339	33
1946-47	36,393	8,175	2,016	106
1947-48	39,795	9,114	2,201	81

TABLE C.—Arrests by Los Angeles County Sheriff's Office

Year	Total Arrests	Drunk	Drunk Driving	Liquor Laws
1937-38	18,782	5,253	1,108	32
1938-39	18,426	4,835	1,167	45
1939-40	19,062	5,183	1,063	58
1940-41	21,201	5,405	1,109	17
1941-42	19,736	5,123	1,160	44
1942-43	18,529	4,725	1,056	71
1943-44	19,273	4,884	850	28
1944-45	20,431	4,861	869	18
1945-46	22,238	5,886	1,141	25
1946-47	28,878	7,901	1,501	114
1947-48	26,214	7,843	711	130

Angeles Police Department now books more of its prisoners in the county jail.

The Los Angeles City Police Department Annual Report for 1947 reveals:

1. Motor vehicle traffic injury accidents:

Condition of driver:	
Had been drinking	2,756
Physical defect	232
Asleep, fatigued, etc.	173
Other handicaps	140
Total	3,301

2. Total traffic violations numbered 10,610. Of this number 612 were under the influence of alcohol.

3. Accidents involving pedestrians:

Condition of pedestrian:	
Under influence of alcohol	116
Other had been drinking	381
Total drinking, and effects	638

4. Causes of street traffic accidents:

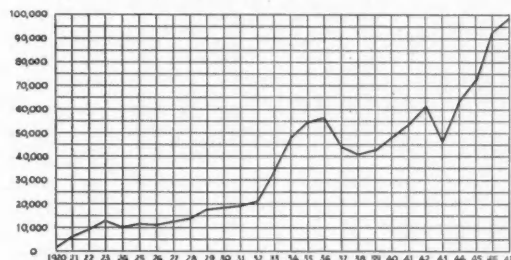
Drunk driving—felony	1
Drunk driving—misdemeanor	1,074
Total all causes	11,926

(Report continued on next page)

TABLE A.—Showing Increasing Number of Accidents Involving Drivers Who Had Been Drinking

Year	HBD Drivers		HBD Pedestrians		Total HBD Persons Involved in Accidents	
	Total Accidents	Fatal Accidents	Injury Accidents	Total Accidents	Fatal Accidents	Injury Accidents
1936	4,182	406	3,776	1,169	211	958
1937	4,438	422	4,016	1,246	217	1,029
1938	4,483	371	4,312	1,202	165	1,037
1939	5,070	403	4,667	1,218	191	1,027
1940	5,516	383	5,133	1,339	196	1,143
1941	6,789	447	6,342	1,679	235	1,444
1942	7,218	434	6,784	1,707	167	1,540
1943	6,551	423	6,128	2,101	239	1,862
1944	6,900	412	6,488	1,908	193	1,715
1945	9,082	601	9,481	2,349	249	2,100
1946	10,424	668	9,756	1,986	202	1,784
1947	10,612	607	10,005	1,719	173	1,546

5. Fatal motor vehicle accidents:
 Condition of pedestrian:
 Under influence of alcohol..... 4
 Other had been drinking..... 28
 Total..... 223
 Driver had been drinking..... 69
6. Arrests for intoxication:
 By calendar year Jan. 1920 to Dec. 1947:



7. Arrests bookings (traffic)—drunk driving, 17 of 61.
 8. Arrest bookings (Municipal Code)—drunk, 6,823 of 7,732.
 9. Arrests for drunkenness, 97,483 of 142,938 (all arrests).
 10. Arrests for driving while intoxicated, 2,611 of 142,938 total arrests.

(b) *Felonies, misdemeanors and asocial behavior*: A Federal Bureau of Investigation study in 1940 of 1,212 cities with a population of 41,146,894, indicated that of all those arrested, 11.81 per cent were held for drunkenness, 3 per cent for disorderly conduct, 1.68 per cent for vagrancy and 0.76 per cent for driving while intoxicated.

In 1940, in 79 cities with a population of 13,493,387, 155,528 were found guilty of drunkenness, disorderly conduct and vagrancy, and 7,267 of driving while intoxicated. The investigators estimate that persons arrested for drunkenness cost 70 per cent of the amount spent for 3,000 county and local jails, which is equal to \$25,550,000.

5. Individual Effects:

(a) *Incidence of drinkers and addicts and development of alcoholic habits during adolescence*: In 1940 about 2,400,000 excessive drinkers were reported in the United States, of whom 600,000 were chronic alcoholics. It is estimated that expenditures for disease were about 33 1/3 per cent higher in the alcoholic than the average of \$23, or \$30.70 per alcoholic. Thus, for 2,400,000 persons the increased cost due to alcoholism is \$18,480,000.

There are 100,000,000 people in the United States of drinking age (over 15); of these 50,000,000 use alcoholic beverage. Of these, 3,000,000 become excessive drinkers and of this number 750,000 become chronic alcoholics. In other words, of 1,000 users, 60 become excessive and compulsive drinkers without chronic alcoholism and of these, 15 become chronic alcoholics with or without compulsive drinking. Hence inebriety is found in 6 per cent of the users (50,000,000) or 3,000,000. Of these, 2,600,000 are men, of whom 2,100,000 are between 30 and 60 years of age. The American Youth Commission Study of 1938 reported on 13,528 individuals between the ages of 16 and 24, of whom 52.9

per cent drank alcoholic beverages, 9.3 per cent were generally opposed to drinking liquor, and 27.8 per cent did not use liquor, but were not opposed to others' using it. In 1938 the Northwestern Life Insurance Company reported 40 per cent of men and 8 per cent of women among applicants under 30 admitted that they used alcoholic beverages.

(b) *Deaths from alcoholism*: In 1940 the Bureau of the Census reported 2,531 deaths as due to alcoholism; and alcoholism was given as the primary cause in 3,109 deaths. Of those whose death was due to alcoholism, 13.6 per cent were involved in fatal accidents. It is probable that at least 50 per cent of deaths from alcoholism are unreported as such, due to reluctance of physicians to certify alcohol as the cause of death. Moreover, in many cases cirrhosis of the liver and other fatal conditions largely attributed to alcoholism are not designated as due to alcoholism. Jellinek concluded in 1940 there were 15,250 deaths from alcohol and cirrhosis and that the fatal accidents in the chronic alcoholic population were estimated to be 2,074. The total inebriate population is four times the chronic alcoholic population. The fatal accidents among all inebriates numbered 8,296 in 1940, and 698,130 alcoholics were involved in non-fatal accidents. This made a total of 706,426 fatal and non-fatal accidents in the entire inebriate group, which is equal to 9 per cent of the total of 7,843,049 fatal and non-fatal accidents in the general population 15 years of age and over.

(c) *Medical, physiologic and pathologic effects*: Certain bodily diseases are more frequent in excessive drinkers, for example, vitamin deficiency and cirrhosis of the liver. Chronic alcoholics are more susceptible to polyneuropathy and pneumonia and are less liable to survive pneumonia. Twenty per cent of chronic alcoholics in hospitals complain of burning sensations in the feet and of pains in the legs—symptoms similar to those seen in dry beri beri. Pellagra is obvious in more than 10 per cent. A British insurance company study showed abstainers had a greater life expectancy at every age level; the greatest difference, 3.9 years, was shown at the age of 25. After that it declined until at age 60, there was a difference of one year. About 10 per cent of alcoholics develop diseases of the mind from long heavy drinking. There are probably 5,000 to 6,000 instances of delirium tremens every year in the United States. Disorders of chronic alcoholism are essentially nutritional disturbances. Of all persons discharged from New York general hospitals in 1933, 2.7 per cent had received treatment for alcoholism.

The effect of alcohol on the body, apart from its action on the brain, can be divided into acute and chronic phases. The principal acute effect is on the stomach. This effect may be asymptomatic if the ingestion is slow. Mild stages of nausea may follow. The individual effect varies; some persons are stimulated to eat, while others lose all taste for food. It is in this latter group that nausea and vomiting usually develop. While a certain amount of the nausea

and vomiting that occur is due to the central effect, another factor is the irritation of the gastric mucosa. At times this irritation may be great enough to cause slight or even massive bleeding from the stomach. Diarrhea may follow. It is well known that many people with peptic ulcers have their first hemorrhage after the use of alcohol. We may summarize by saying that the acute effects of alcohol are disabling but are not often serious.

The chronic users of alcohol may develop some form of cirrhosis of the liver, various vitamin deficiencies, and increased liability to infection. There is a great deal of work to show that these chronic effects of alcohol are not due to the alcohol itself but are attendant upon the vitamin deficiency that ensues. This occurs through two mechanisms. First, those who drink a great deal usually are poor eaters, heavy smokers, and light sleepers. This means that their vitamin intake is reduced, and coupled with this they rarely eat fresh fruits or vegetables. In addition, alcohol requires considerable amounts of thiamine, riboflavin, and nicotinic acid in the process of being utilized by the body as a source of energy. The resulting vitamin deficiency makes itself known by the presence of sore tongue, cracking around the corners of the mouth, and dry, flaky skin. In the later stages there is a numbness and tingling of the feet and hands. Persons in advanced stages may become paralyzed. Long before actual cirrhosis sets in, the individual notices an increased number of colds and perhaps has had pneumonia a time or two. It is well known that alcoholics do not recover from pneumonia as rapidly as others despite the use of larger than average amounts of penicillin and sulfonamides. This lack of resistance to infections may be secondary to loss of immune bodies, which the ailing liver is no longer able to manufacture in adequate amounts to meet the body's need. With the onset of cirrhosis the patient is in a sad plight. The abdomen swells with fluid, while at the same time the extremities become wasted and weak. He gradually loses strength, and usually has to enter a hospital at intervals to have the fluid removed from the abdomen. Occasionally he vomits blood, this time because there are now large vessels in the stomach developing in an effort to get the blood past the diseased liver. He finally sinks into a coma and dies.

(d) *Psychologic and psychiatric results:* Alcohol is always a narcotic, and its reputation as a stimulant rests on the inhibitory release which it promotes. Parallels are found in symptoms due to disease of the frontal lobes of the brain, in the behavior which follows frontal lobe operations, and in the manic phase of manic-depressive psychosis. In these situations, as in alcoholism, there is loss of inhibition, abolition of self-critique, and in general, regressive behavior. At times, there is shedding of all adult responsibilities, so that the drunkard becomes as an infant with profound loss of control, even involving the functions of the bladder and bowels. The use of alcohol is the most com-

mon mechanism of escape from mature responsibilities.

A number of psychoses are influenced by alcohol, but chronic alcoholism is not a psychosis. Strecker and Ebaugh consider that chronic alcoholism is a psychoneurosis. It is preponderantly the psychoneurosis of the introvert—the shy, reserved, diffident individual who tends to be socially awkward and who acquires social facility only with the greatest difficulty. Alcohol is used to escape reality, just as psychoneurotic symptoms are employed unconsciously for the same purpose. Rationalization is common in both psychoneurosis and alcoholism.

The psychoneurotic person cannot meet the requirements of everyday reality because of headache, vertigo, nausea, vomiting, tachycardia, etc., which are derived from emotional conflicts and not produced by structural pathology. The pathologic drinker exhibits extreme rationalization in giving his "reasons" for his excessive drinking. He drinks because he has financial losses, because his health is poor, because his wife nags him, even because of unpleasant weather conditions. These rationalizations, like the symptoms of the psychoneuroses, become screens used unconsciously to prevent an honest facing of real basic issues.

The basis of alcoholism, as of psychoneurosis, is *emotional immaturity*, and as in the psychoneurosis the immaturity is rooted in childhood. Case records show a common situation in alcoholic patients during childhood. Parental dominance (usually "loving" dominance) prevented them from learning to make decisions; emotional growth lagged. When adult years were attained, the individuals were ill equipped for the give-and-take of personal social relationships. They became thwarted and frightened. Soon they discovered temporary confidence and security in alcohol.

Homosexuality probably plays only a small part in the cause of alcoholism; latent heterosexuality is more important. This is part of the emotional immaturity, allowing a "casual fitting about sexually," and constituting an evasion of the mature responsibilities of sex, home building and children.

Those who cannot face reality without alcohol; who take morning drinks and who drink alone; those who cannot control their excessive drinking, are chronic alcoholics. They cannot make adequate adjustment to reality as long as they use alcohol.

The following classification of alcoholism from Strecker and Ebaugh's "Clinical Psychiatry" divides the patients into etiologic groups:

1. Social drinking.
2. Reactive alcoholism: In those who drink in relation to or as an escape from some vocational, marital, economic or physical difficulties.
3. Symptomatic alcoholism: In which alcoholism exists as one manifestation of the behavior difficulties encountered by patients suffering from one of the psychoses.
4. Alcoholism in a psychoneurosis: Where the psychoneurosis seems to be the etiologic factor.

5. **Alcoholism simplex or essential alcoholism:** The group where no factors are found which can be reasonably labeled etiologic. Many patients classified as "psychopathic personalities" are included in this group.

This practical classification is further elaborated as follows:

1. **Social Drinking:** Under this heading may be included that wide and much discussed group ordinarily called "normal" or "social" drinkers. It may be presumed to include that group whose drinking varies from an annual Christmas eggnog to the daily before-dinner cocktail, and perhaps may include an occasional vacation spree. To be included in this group the person must in no way be dependent upon the toxic effect of alcohol. Many persons who consider themselves social drinkers probably border upon the situational group. In all instances they are able to indulge in or forego the pleasure of the alcohol, depending upon the proprieties of the occasion.

2. **Reactive Alcoholism:** Within this group fall that heterogeneous assortment of individuals who drink in relation to or as an escape from some environmental situation. Persons drinking in relation to vocational, marital, economic and physical difficulties not related to deep-seated personality problems may be properly included here. It is believed that a more thorough understanding of the alcoholic patient will result in a gradual absorption of this group into other headings of the classification.

3. **Symptomatic Alcoholism:** This is the phase of the problem in which the alcoholism exists as one manifestation of the behavior difficulties encountered by patients suffering from one of the major organic or functional psychoses. The alcoholism may temporarily color the general reaction, but careful study reveals the true situation and suggests the proper treatment.

4. **Alcoholism in Psychoneurosis:** In certain alcoholic patients psychoneurosis seems to be the etiologic factor. Certain of these persons use alcohol for a relief of the tensions and anxieties accompanying the disorder; and in other persons the alcoholism itself is the prominent manifestation of the neurotic mechanism. The analytic literature contains numerous examples of the latter kind of patients.

5. **Alcoholism Simplex or Essential Alcoholism:** Into this category are placed those patients in whom there can be found no factors which can reasonably be labeled etiologic. Such persons present a problem which is neither essential nor simple and the terms are used to mask our ignorance as to the true psychopathology of this state. Many persons who drink excessively and who may be classified as having "psychopathic personalities" are included in this category. Alcoholic psychoses are commonly classified as: (a) Pathologic intoxication; (b) Delirium tremens; (c) Korsakoff's psychosis; (d) Acute hallucinosis; (e) Chronic hallucinosis; (f) Acute paranoid type; (g) Alcoholic deterioration.

Rosanoff delineates Miles' scale of toxic symptoms from alcohol as follows:

Alcohol in the Blood (Percentages)	Subjective States and Observable Changes in Behavior Under Conditions of Heavy Social Drinking
------------------------------------	--

- | | |
|------|--|
| 0.01 | Clearing of the head. Freer breathing through nasal passages. Mild tingling of the mucous membrane of the mouth and throat. |
| 0.02 | Slight fullness and mild throbbing at back of head. Touch of dizziness. Sense of warmth and general physical well-being. Small bodily aches and fatigue relieved. Not fretful about the weather nor worried concerning personal appearance. Quite willing to talk with associates. Feeling tone of pleasantness. |

Alcohol in the Blood (Percentages)	Subjective States and Observable Changes in Behavior Under Conditions of Heavy Social Drinking
------------------------------------	--

- | | |
|------|--|
| 0.03 | Mild euphoria: "Everything is all right," "Very glad I came," "We will always be friends," "Sure, I will loan you some money," "It isn't time to go home yet." No sense of worry. Feelings of playing a very superior game. Time passes quickly. |
| 0.04 | Lots of energy for the things he wants to do. Talks much and rather loudly. Hands tremble slightly, reaching and other movements a bit clumsy; laughs loudly at minor jokes; unembarrassed by mishaps, "You don't think I'm drunk do you, why I haven't taken anything yet." Makes glib or flippant remarks. Memories appear rich and vivid. |
| 0.05 | Sitting on top of the world, "a free human being," normal inhibitions practically cut off, takes personal and social liberties of all sorts as impulse prompts. Is long-winded and enlarges on his past exploits. "Can lick anybody in the county," but has observable difficulty in lighting a match. Marked blunting of self-criticism. |
| 0.07 | Feeling of remoteness. Odd sensations on rubbing the hands together, or on touching the face. Rapid strong pulse and breathing. Amused at his own clumsiness or rather at what he takes to be the perversity of things about him. Asks others to do things for him. Upsets chair on rising. |
| 0.1 | Staggers very perceptibly. Talks to himself. Has difficulty in finding and putting on his overcoat. Fumbles long with the keys in unlocking and starting his car. Feels drowsy, sings loudly, complains that others don't keep on their side of the road. |
| 0.2 | Needs help to walk or to undress. Easily angered. Shouts, groans, and weeps by turns. Is nauseated and has poor control of urination. Cannot recall with whom he spent the evening. |
| 0.3 | In a stuporous condition, very heavy breathing, sleeping and vomiting by turns. No comprehension of language. Strikes wildly at the person who tries to aid him. |
| 0.4 | Deep anesthesia, which may be fatal. |

Postmortem findings vary according to the stage of the disease at death, the severity and duration of the alcoholism, and the existence of complications, such as avitaminosis and circulatory disease.

The changes found in the central nervous system include pachymeningitis, hemorrhagica interna, cerebral atrophy, polioencephalitis hemorrhagica superior of Wernicke. Acute cerebral edema is found in those dying in an acute delirious state. Shrunken convolutions, moderate dilatation of the ventricles, and thickening and opacity of the pia-arachnoid may be noted.

Because of the popularity of social drinking alcoholism has never been defined exactly. A person may be considered to be alcoholic when he becomes dependent upon the toxic effects of the drug to carry out his work or to meet his social obligations. Alcoholism of itself is responsible for approximately 10 per cent of all mental disease and occurs as a symptom in many of the major psychotic reactions and in some of the psychoneurotic states. Even in moderate doses alcohol lessens motor activity, diminishes physical strength, lowers the fatigue point, interferes with clarity of ideation, impairs

capacity for judgment and mental work, and interferes with the sharpness of memory. Many individuals become quite unstable emotionally under the influence of alcohol. It acts as a direct poison to the cortical cells.

Treatment of the Problem and the Addict

1. Legal Control of the Industry and Sale of the Product:

All states and territories have constitutional provisions for the control of manufacture, sale and taxation of alcoholic beverages.

Traffic in alcoholic beverages in California is governed by the provisions of Section 22 of Article XX of the State Constitution, effective December 20, 1934; the Alcoholic Beverage Control Act, the Health and Safety Code, the Penal Code, and the Statutes of the United States.

The State Board of Equalization is charged with administration of the Alcoholic Beverage Control Act and issues licenses. Local officials and the board are charged with the duty of enforcing the law.

(1) The eighteenth article of amendment to the Constitution of the United States was repealed by United States Constitutional Amendment No. 21. (Eighteenth amendment effective May or June 1919; twenty-first amendment effective December 5, 1933.)

(2) The transportation or importation into any state, territory or possession of the United States for delivery or use therein of intoxicating liquors, in violation of the laws thereof, is prohibited.

The provision of the Alcoholic Beverage Control Act imposing a license fee of \$500 for the privilege of importing beer within the state does not violate the federal Constitution.

Shipment through the state: The twenty-first amendment has no application to the transportation of liquor through a state; hence liquor purchased for shipment to Hawaii but temporarily stored in San Francisco warehouses is not subject to local property taxation.

California Constitution, Article XX, *State Control of Liquor Sales*:

The license fee required of bona fide hotels, restaurants, cafes, cafeterias, railroad dining or club cars, passenger ships and other public eating places, and any bona fide clubs, after such clubs have been lawfully operated for not less than a year, for the privilege of keeping, buying, selling or otherwise disposing of intoxicating liquors other than beers and wines, is \$250 per year or \$62.50 per quarter annum for seasonal business, subject to the power of the State Board of Equalization to change such fees.

Apportionment of fees and taxes: The Legislature provides for apportioning the amounts collected for license fees or occupation taxes between the State and the cities, counties and cities and counties of the state.

TYPES OF LICENSES; FEES

	Per Year
(1) Beer manufacturer's license	\$750.00
(2) Wine grower's license (to be computed only on on the gallonage produced) :	
5,000 gal. or less.....	20.00
Over 5,000 gal. to 20,000 gal.....	40.00
Over 20,000 gal. to 100,000 gal.....	75.00
Over 100,000 gal. to 200,000 gal.....	100.00
(3) Distilled spirits manufacturer's license.....	125.00
(4) Still license (per still)	10.00
(11) Beer bottling or packaging license.....	500.00
(12) Distilled spirits wholesaler's license.....	250.00
(13) Beer and wine wholesaler's license.....	50.00
(16) Retail package off-sale general license for the first \$10,000 retail sales of distilled spirits per year	110.00
For each \$1,000 or fraction thereof over \$10,000 per year	10.00
(23) On-sale general license	75.00
Plus an amount in accordance with the fol- lowing:	
a. In cities of 40,000 population or over.....	450.00
b. In cities of less than 40,000 but more than 20,000 population	300.00
c. In all other localities.....	250.00
(25) Wine rectifier's license.....	250.00

(For other fees and regulations see California Alcoholic Beverage Control Act 1947, page 20.)

Section 23—Tax on Beer and Wine: (a) On all beer 62 cents for every barrel containing 31 gallons and appropriate rate for any other quantity. (b) On all still wines containing not more than 14 per cent of absolute alcohol by volume, 1 cent per wine gallon and proportionate for other quantity. (c) On all still wines containing more than 14 per cent of absolute alcohol by volume, 2 cents per wine gallon and proportionate for other quantity. (d) On champagne, sparkling wine, 1½ cents on each bottle or other container for each half pint or fraction thereof contained therein. (e) Sparkling hard cider 2 cents per wine gallon and proportionate for other quantity.

Section 24—Tax on Distilled Spirits—of proof strength or less, 80 cents per wine gallon and proportionate for other quantity; distilled spirits in excess of proof strength are taxed double the above rate.

Section 37—Disposition of Funds Collected: All moneys collected as license fees and under the excise tax provisions of this act are deposited in the State Treasury to the credit of the Alcoholic Beverage Control Fund. Moneys are apportioned as follows:

(a) All moneys collected from fees are paid semi-annually to the counties, cities and counties, and cities of this state in the proportion that the amount of the fees collected in the particular county, city and county, or city bears to the total amount so collected throughout the state, and the State Controller, during the months of April and October of the year, draws his warrants upon the fund in favor of the treasurer of each county, city and county, and city for the amount to which each

is entitled; (b) Such amount as is necessary for the allowance of the refunds provided for in the act; (c) Any remaining balance is transferred to the general fund on the order of the Comptroller.

Section 61—Sales to Minors: (a) Every person who sells, furnishes, gives or causes to be sold, furnished or given away any alcoholic beverage to any person under the age of 21 years is guilty of a misdemeanor. (This includes married women under 21.) (b) Any minor who purchases any alcoholic beverages or any minor who consumes any alcoholic beverage in any on-sale premises is guilty of a misdemeanor.

Section 61.2: For the purpose of preventing the violation of Section 61 of the act any licensee or his agent or employee may refuse to sell or serve alcoholic beverages to any person who is unable to produce adequate written evidence that he or she is over the age of 21 years.

Section 62—Sales to Habitual Drunkard: Every person who sells, furnishes, gives or causes to be sold, furnished or given away any alcoholic beverage to any habitual or common drunkard or to any obviously intoxicated person is guilty of a misdemeanor.

From Alcoholic Beverage Control Bulletin, State Department of Equalization, Legal Control Division (four issues of 1948, April, May, June and July):

REVENUE DATA

Alcoholic beverage license fees collected in:

March 1948	\$ 165,935.74
April 1948	517,464.53
May 1948	134,291.74
June 1948	1,220,286.31
Total fees 1948 to date.....	3,939,735.66
Total fees collected 1947.....	8,417,280.50
Total fees 1943-46.....	78,148,746.65
Total fees collected.....	90,505,762.81
Less refunds to date.....	1,247,534.36
Net revenue to June 30, 1948.....	89,258,228.45

ALCOHOLIC BEVERAGE LICENSES ISSUED

March 1948	3,499
April	2,039
May	1,564
June	1,505

Total issued to June 30, 1948: 58,080.

ALCOHOLIC BEVERAGE TAX SUMMARY

Distilled spirits excise tax:

February 1947	\$ 1,051,757.24
February 1948	904,931.07
March 1947	1,029,560.93
March 1948	1,133,876.77
April 1947	938,402.04
April 1948	1,107,038.17
May 1947	954,263.34
May 1948	959,722.01
Total tax Jan. 1 to May 31, 1948.....	5,008,136.37
Total tax July 1 to Dec. 31, 1947.....	143,137,177.18
Total tax to date.....	148,148,313.55
Less refunds	100,092.17
Net tax July 1, 1935, to May 31, 1948.....	148,045,221.38

(Tax summary continued at top of adjoining column)

Beer and wine excise tax:

February 1947	\$ 219,625.21
February 1948	237,105.14
March 1947	291,744.37
March 1948	296,981.93
April 1947	338,147.95
April 1948	299,698.91
May 1947	251,856.49
May 1948	280,159.96
Total tax Jan. 1 to May 31, 1948.....	1,388,484.04
Total tax April 4, 1933 to Dec. 31, 1947.....	35,179,225.16
Total tax to date.....	36,567,709.20
Less refunds	56,696.79
Net tax April 4, 1933 to May 31, 1948.....	36,511,012.41
Total alcoholic beverage excise tax to date.....	\$184,556,233.79

BEER AND WINE DISTRIBUTION

Beer sales in gallons:

February 1948	11,466,535.73
March 1948	13,669,330.13
April 1948	13,961,450.66
May 1948	13,261,763.45

Still wine under 14 per cent in gallons:

February 1948	1,476,229.26
March 1948	1,734,232.71
April 1948	1,666,915.88
May 1948	1,663,713.91

Still wine over 14 per cent, sales in gallons:

February 1948	7,031,743.57
March 1948	8,106,635.44
April 1948	7,825,586.96
May 1948	6,218,519.12

Sparkling wine sales in half pints:

February 1948	539,371
March 1948	477,086
April 1948	537,066
May 1948	593,634

The *Alcoholic Beverage Control Bulletin* further details the beer shipments into California by out-of-state breweries (in gallons); the sales by California breweries in gallons; the sales by California beer importers in the southern district; a summary of beer and distilled spirits gallonage shipped from California to other states and countries; distilled spirits excise tax payments of over \$1,000; distilled spirits excise payments by administrative districts; wine taxes of over \$100 paid by California wine growers; board orders denying, suspending and revoking alcoholic beverage licenses, with the reasons for such; protests sustained; and the legal seizure reported under the provisions of the Alcoholic Beverage Control Act by months.

Allocation to cities and counties of their share of license fees collected from July 1, 1947, to December 31, 1947:

The total amount of net fees distributed was \$1,882,454. Examples of allocation of this distribution are as follows:

Berkeley (city)	\$ 10,693
Alameda (county)	123,845
Fresno (city)	22,916
Fresno (county)	46,911
Bakersfield (city)	11,938
Long Beach (city)	39,687
Los Angeles (city)	255,995
Los Angeles (county)	584,861

Unincorporated areas of Los Angeles County.....	63,688
Pasadena (city)	13,721
Santa Monica (city)	15,149
Corona (city)	1,050
Sacramento (city)	45,507
San Francisco (city and county).....	308,149
Santa Barbara (city).....	10,200

Public Revenues and Their Uses (1911-1947): Federal revenue from alcoholic beverages each year has amounted to over one-third of the total receipts of taxes levied by the national government.

The Tax Institute of the University of Pennsylvania data on the public revenues from alcoholic beverages in 1940 are: Total federal tax receipts in 1940 were \$4,860,524,000, of which \$624,253,000 came from alcoholic beverages. Added to this is \$32,340,000 for customs receipts from alcoholic beverages. The total state tax revenues were \$3,267,165,886, of which \$243,776,068 came from alcoholic beverages. To this must be added the net profits in the "monopoly states," amounting to \$66,057,520. The revenues from alcoholic beverages collected by local governments were estimated by the Tax Institute at \$3,500,000 out of total local receipts of \$4,745,000,000. Thus, the revenues from alcoholic beverages totaled \$969,926,588 of total public revenues of \$12,872,689,886 (not including payroll taxes). This is almost 8 per cent of all tax revenue. The Distilled Spirits Institute publishes a somewhat higher figure of \$1,140,110,006.

No information is available regarding the use of federal alcohol tax receipts. It is general practice to retain local receipts from licenses for the general purposes of local government. The state revenues (\$243,776,068 in license states and net profits of \$66,057,520 in monopoly states) are in many instances designated for specific purposes. Thus in Alabama 10 per cent of state beer taxes is allotted to state welfare funds and 10 per cent to the public welfare funds of 67 counties. In Colorado—of state license fees and excise taxes, 5 per cent for administration and 85 per cent of the remainder to the old age pension fund. Florida—of the state license fees and excise taxes, 7 per cent for administration, \$3,400,000 of the remainder to old age assistance, the next \$400,000 to crippled and disadvantaged children, and the balance to general fund for distribution to public schools. Georgia—all license fees and excise tax go to common schools. Indiana—of retail profit fees, one-third to tuition funds of the school taxing units of the state. Louisiana—portion of spirits and wine license fees must be used exclusively for homestead tax exemptions. Beer license fees and excise taxes apportioned to public schools and conditionally to various charitable institutions. Missouri—proceeds from seizures and confiscations to county treasuries for benefit of schools. Montana—of state monopoly proceeds, 5 per cent to teachers' retirement fund and up to \$5,000 to the Temperance Commission Fund. Of state license fees—50 per cent to public school fund and portion of the remainder to public welfare fund. New Mexico—largely all state rev-

enues to social security, aid to dependent children, needy blind, and for emergency school fund. Ohio—most of sales tax on beer to poor relief and workmen's compensation fund. Oklahoma—most of state license fees and excise taxes distributed to county school districts. South Dakota—about one-half of receipts from beer and wine licenses, fees and excise taxes to counties for relief and hospitalization and indigent. Texas—state license fees to the old age assistance fund; of the state excise taxes one-fourth to state school funds, three-fourths to old age assistance. Washington—over one-half of state sales tax receipts to state current school fund. West Virginia—sales tax receipts to school funds. Wisconsin—portion of state excise taxes on spirits and wine to state aid of public schools.

There is a general tendency in the states to use portions of the public revenues from alcoholic beverages for educational and social purposes. We have no information of any state's designating revenue for the treatment of the alcoholic patient. A few states may use these funds for mental illness.

Summary and Conclusions: A probable minimal expenditure of \$778,903,000 due to the antisocial behavior of inebriates and of conditions due to inebriety has been calculated for the year of 1940. This total might have been higher if more information had been available. It has also been found that the heavily taxed alcoholic beverage industry produced revenues of \$969,926,588 for public treasuries in 1940. In 1943 revenues from this source amounted to \$1,423,647,000. None of this money was designated for discovery of ways and means of preventing inebriety or for reducing the costs that result from the behavior of those who drink to excess. In 1945 Massachusetts, Connecticut, New Jersey and Indiana proposed plans to allocate a part of the revenues from alcoholic beverages for the treatment of alcoholics and for research on alcoholism.

The New Jersey State Legislature in 1947 enacted a law placing the treatment of alcoholics under the supervision of the State Department of Health, with provisions for their hospitalization and for research on the problem. The costs were to be borne by the state from allocated funds.

Thus, except for the recent efforts of these states, the total effect of the policies is that the state and the public have a socially irresponsible attitude towards alcoholism.

The Department of Finance, State of California, in reply to our request for information concerning the usage and application of liquor license fees distributed to local governments, answered as follows:

"The state law governing distribution of liquor license fees does not specify the fund in which local governments shall deposit such apportionments or the purposes for which the money may be spent beyond the general requirement that state funds are to be expended for a state purpose.

"Since counties are legally subdivisions of the state, the obligation to spend funds for 'a state pur-

pose' is not restrictive. We are informed that liquor license fees received by counties are deposited in the general funds of the several corporations, and the general restriction requiring expenditure for state purpose presumes that such receipts will be spent for liquor enforcement, police protection, traffic control, lighting, etc. We are told that cities, too, deposit their liquor license fee receipts in their general funds.

"The League of California Cities has been studying the problem of state restrictions over subventions to municipal governments and, no doubt, can give you additional information regarding the allocation and use of liquor license fee receipts."

The Department of Finance also sent our request for information to the League of California Cities, which answered through its legal counsel to the effect that, "Liquor license fees paid to cities under the provisions of Section 37 of the A.B.C. Act must, according to the Attorney General's Opinions NS 505, 505a and 505b, be expended by cities for a 'state purpose.' The courts are reluctant to define 'state purpose' and do so only in each case presented to them rather than by stating a broad definition which could be used to determine whether a given purpose was a state purpose under any circumstances. Generally speaking, education, schools, libraries, matters relating to health and sanitation, flood control, law enforcement, traffic regulation and enforcement of the A.B.C. Act itself are probably 'state purposes.'"

"Although it is true to a large extent that the counties spend most of their funds as agents of the state, it is also true that they perform some purely local services in the unincorporated areas of the county. However, in the main, the counties are merely agents of the state, performing state functions. To this extent it is, of course, improper to speak of the state budget as being in part for state expenditures and in part for subventions to local government. It hardly seems proper to call an action a subvention when the agent is merely acting on behalf of the principal."

2. Attitudes of Judicial Agencies:

The reported attitude of the Los Angeles courts which handle psychiatric cases is that there is no tendency to order treatment for alcoholics unless they are psychotic. They seem to act on the premise that anyone should have sufficient concern to cooperate in the treatment of his diseases and should not be forced to accept undesired treatment. There appears to be no consistent policy on the part of the courts in cases involving alcoholism, unless psychosis be present. There is need for evaluation of this situation in order that the medical aspects may receive fuller consideration.

3. Medical Aspects—Treatment of the Acute Alcoholic and Chronic Drinker:

The medical treatment of the acute alcoholic may require astute judgment. As thorough physical and neurologic examinations as are possible need to be

accomplished initially, despite the usual hyperactivity and resistance of the patient. It must be recognized that alcohol is a physiologic depressant, and further unnecessary sedation should be avoided. Frequently the patient is noisy and restless, and it may be obligatory to use some sedation. The less used, the less interference with therapy.

Increasing doses of strychnine sulfate every three hours for 36 to 72 hours have been utilized in the past. Still better treatment, however, approaches the toxic condition from a physiologic viewpoint and uses drugs which tend to counteract the depressant effects of alcohol and replace lost food elements.

The usual practice in the treatment of acute alcoholic patients admitted upon a neurologic service at Los Angeles County General Hospital through the past years has included high dosage of thiamine chloride in 10 per cent glucose and normal saline solution administered intravenously. Another method is the use of 10 cc. of metrazol and 100,000 units of thiamine chloride in 1,000 cc. of 10 per cent glucose in normal saline; 25 units of insulin is meanwhile injected intramuscularly. This amount of metrazol, slowly administered in the intravenous drip injection, has not provoked convulsions. On the contrary, it has appeared to lessen the tendency to convulsions, and, in instances where convulsions had been occurring, they stopped. This same treatment may be repeated in four to six hours if indicated by persisting symptoms. A third injection may be given.

Another treatment widely used consists of the administration of 50 cc. of 50 per cent glucose solution containing 50,000 to 100,000 units of vitamin B, accompanied by intramuscular injection of 25 units of insulin. This method, however, without the stimulating metrazol, allows convulsions to occur and makes hypoglycemia possible. Obviously, further glucose solution must be given when indicated.

Seliger of Baltimore offers a preliminary report on extramural treatment of severe delirium tremens in the August 1948 issue of the *American Journal of Psychiatry*. He suggests that it is necessary to develop an extramural technique for treating patients with acute alcoholism because of the shortage of hospital beds and the high cost of hospitalization.

A method which he has used successfully includes the initial use of 1 to 2 gr. of phenobarbital and 3 gr. of sodium dilantin as an anticonvulsant which follows a short physical and neurologic examination. An intravenous injection of 1,000 to 2,000 cc. of 10 per cent dextrose in normal salt solution is then administered. Thiamine chloride, 100,000 to 200,000 units, and 25 units of insulin are introduced into the tubing. Phenobarbital, 1 to 2 gr., and dilantin, 3 gr., are repeated in one and one-half hours after that. No alcohol is given, and candy and heavily sugared orange juice should be available should mild reactions occur. Seliger concludes that this treatment will clear up uncomplicated cases of delirium tremens in individuals under 55 years of

age in about ten hours. In some instances it may be wise to administer another 1,000 cc. of the intravenous glucose with insulin and thiamine on the following day, and for several days the patient should be kept on phenobarbital, 1 gr., and sodium dilantin, 3 gr., thrice daily, together with 50,000 to 100,000 units of thiamine intramuscularly.

Another form of treatment in the rehabilitation of the alcoholic is the so-called conditioned reflex treatment as applied by Voegtlin and Le Mere. This consists in inducing emesis with the injection of emetine hydrochloride which the patient thinks is an injection of a vitamin or some other medication. When the patient begins to show the vasomotor evidences of nausea he is given a large dose of liquor in an appropriate situation, including his choice of common brands of whiskeys, accompanied by other forms of positive suggestion in the conversation. The emesis is usually interpreted by the patient as being induced by the whiskey. This procedure is repeated according to routine and soon the patient experiences nausea upon seeing or smelling alcoholic beverages. The authors indicate success in about three-fourths of their alcoholic patients thus treated. It seems obligatory to give psychotherapy following this aversion type of treatment.

Meanwhile, during treatment of the acute condition, careful examinations are repeated and laboratory tests accomplished. Pulmonary congestion, pneumonitis or frank pneumonia may be present. Liver disease is common in these patients. They may have a full bladder which they are unable to empty, and various types of heart disease may be present. Neurological examination may suggest the presence of subdural hematoma or subarachnoid or intraventricular hemorrhage. Lumbar puncture and examination of the spinal fluid may assist in this determination. Should neurologic symptoms with varying depths of coma persist or recur, subdural hematoma may indeed be present.

The physical examination should meanwhile determine the presence and extent of any bony or soft tissue damage which may have been incidentally incurred during the irresponsible state induced by alcohol. Roentgenologic studies, particularly of the skull, should be accomplished, even upon slight suspicion.

Following control of the more acute symptoms, intensive vitamin therapy will be needed for days. Nutrition should be high in calories and protein content. Sedation is to be avoided, although it is recognized that hyperactivity, restlessness, noisiness and insomnia need to be controlled. During this less acute state, the effects of mild sedation are not as deleterious as in the depressed state of acute alcoholism.

Investigation of the personal history and character structure should be begun as soon as the patient is sufficiently lucid. During this period he is usually morose and acutely cognizant of the serious effects of his recent debauch. He is more receptive and responsive to direct suggestions, directions and assistance in future planning. This psychotherapy

should be continued. If private care can be arranged, it is highly desirable to place the patient in a sanitarium where alcoholic abstinence can be enforced. Rarely is this possible in the patient's own home, even when ample nursing care and supervision are available. Meanwhile, every effort is made to assist the patient in readjusting to his problems without the use of alcohol. This is done by directing his interests to productive activities and sublimation of his emotional stresses.

4. Public Health Aspects:

The preceding discussion has indicated the general scope of alcoholism as a medical and public health problem. What little is being done currently to apply corrective medical measures is directed at the far end of the process, namely, after alcoholism is well established. From a public health standpoint in this, as in other problems of disease prevention, the point of attack should be at the cause, or at least at the beginning of the process.

As in the control of such chronic infectious diseases as tuberculosis and syphilis, treatment of the person who actually has the disease is imperative. Frequently, however, even arrest of further progress of the disease is not possible. If arrest of the disease is accomplished, as in *tabes dorsalis*, restoration to normal health may not be possible. The same principle applies in alcoholism as in tuberculosis and syphilis. The key to solution of the problem is prevention.

A carefully planned, broad, and continuous public educational program is of basic importance. It is recognized that education alone will not suffice; cases will develop in spite of such efforts. The educational program, therefore, needs to be supplemented by organized state and community effort to detect cases in incipient stages and to provide individual care. Such a plan follows public health and medical efforts to control tuberculosis and syphilis. The second line of defense becomes the recognition of the case of alcoholism at its inception. It may be anticipated that a significant proportion of alcoholics can be cured if the disease is attacked at its onset. A broad medical and public health community program will be necessary in order to attack the problem effectively along this second line of defense.

Even with these two lines of defense, a proportion of cases of alcoholism will go on to the advanced stage, just as some cases of tuberculosis and syphilis either are missed by the screening process or progress despite the application of all known medical knowledge. For such cases the third line of defense becomes the hospitals for long term permanent care. All these three lines of defense must be supplemented by extensive research into new and better methods of attacking the problem at all points.

In the administration of such a broad public health attack on the problem, almost every agency in the state and community is involved. Medical, educational, religious, social, law enforcement, and

judicial agencies all have parts to play. With so many actors on the stage, it will be necessary to devise some plan of organization for direction and coordination.

5. Organizations Active in Meeting the Problem:

Preliminary reports of the operations of the Yale Plan clinics, begun early in 1944, indicate that promising results in the treatment of alcoholics can be obtained by the expenditure of about \$60 to \$100 per person. There is a medical committee, appointed by the state medical society. The aim is to aid the alcoholic to find his way back to useful participation in the community. The extension of these methods of treatments (at about \$100 per patient) to 600,000 alcoholics in the United States would cost \$60,000,000, which is a relatively small portion of the public revenues received from the industry. Such expenditure for prevention and therapy would seem to be wise in the light of the social cost of about \$1,000,000,000 paid annually by the people because of inebriety.

In California the Governor's Crime Commission is studying the problem and preparing to make recommendations at the next meeting of the State Legislature. It is recognized by the officials of this state that it is folly to continue large expenditures for law enforcement without properly directed efforts to control alcoholism.

The California Public Health Department is making studies from both medical and public health aspects.

The National Committee for Education on Alcoholism has a western branch in San Francisco. There is an East Bay Committee on Alcoholism attempting to promote interest in the problem, and a group with similar aims was organized in Los Angeles in the summer of 1948.

The San Francisco Committee for Education on Alcoholism has been active and offers counselling service both to alcoholic applicants and to others involved by their behavior.

A series of lectures and conferences are presented annually in Los Angeles under the auspices of the local mental hygiene group for dissemination of relevant information regarding alcoholism. Numerous lay groups throughout the state attempt the rehabilitation of the addict. These include many church and religious groups, the Salvation Army, the Women's Christian Temperance Union, and local option groups.

Considerable activity has been shown by Alcoholics Anonymous, which was organized in 1936, has had rapid growth and has offered help to thousands of chronic alcoholics. Their monthly publication, "Grapevine," is widely distributed and their frequent meetings in 1,200 localities are well attended by enthusiastic, earnest members. The "Twelve Steps" of their program for recovery are as follows:

1. We admitted we were powerless over alcohol—that our lives have become unmanageable.

2. Came to believe that a Power greater than ourselves could restore us to sanity.
3. Made a decision to turn our will and our lives over to the care of God as we understood Him.
4. Made a searching and fearless moral inventory of ourselves.
5. Admitted to God, to ourselves, and to another human being the exact nature of our wrongs.
6. Were entirely ready to have God remove all these defects of character.
7. Humbly asked Him to remove our shortcomings.
8. Made a list of all persons we had harmed, and became willing to make amends to them all.
9. Made direct amends to such people wherever possible, except when to do so would injure them or others.
10. Continued to take personal inventory and when we were wrong promptly admitted it.
11. Sought through prayer and meditation to improve our conscious contact with God as we understood Him, praying only for knowledge of His will for us and the power to carry that out.
12. Having had a spiritual experience as the result of these steps, we tried to carry this message to alcoholics, and to practice these principles in all our affairs.

Boiled down, these steps mean, simply: (a) Admission of alcoholism, (b) Personality analysis and catharsis, (c) Adjustment of personal relations, (d) Dependence upon some Higher Power, (e) Working with other alcoholics.

Recommendations

1. It is advised that the practicing physician give more time and attention to alcoholics among the families of his patients and those who may consult him about their problem and its treatment. A chronic alcoholic usually has some medical condition resulting from his habit and commonly some personality problem or disorder for which medical treatment is indicated. Alcoholism is as much of a medical problem as other diseases of personality involvement. The physician needs to accept alcoholics both as a personal and a professional challenge. Advice and information given by a doctor, early in the beginning of the alcoholic habit or during the period of social drinking, may prevent patient's physical, economic and social devastation. Young people need advice about alcoholic beverages, for it is found in many medical histories that the chronic drinker and addict began drinking excessively in early youth.

The false glamor and suggestion of enhanced social standing to be achieved by drinking alcohol needs to be dispelled. The family physician can influence excessive drinking habits among his patients and friends as well as in the community. Parents should be informed of the natural tendency of their children to imitate their own habits and customs, including their alcoholic habits. All should be persuaded to avoid excessive drinking. More influence should be brought to bear against driving an automobile after drinking.

Many of the physician's alcoholic patients may be referred to specialists for some psychiatric help—at least to the extent of a few psychotherapeutic sessions. It is hoped that psychotherapeutic clinics

may be developed which will make this approach and treatment more readily and widely available. Meanwhile, the family doctor will be first consulted and must be prepared to treat the individual and his problem.

2. It is strongly recommended that beds in county, municipal and private hospitals be made available for the treatment of acute alcoholics. It is suggested that the influence of medical and public opinion be utilized to implement such an allocation. A minimal bed requirement for such treatments should be two beds per 100 in hospitals of over 500 beds and at least six to eight beds in hospitals with 100 to 500 beds. Here the resident staff will be trained in treating this common disorder. Such a service, properly supervised, should meet with no objections from other patients or hospital personnel.

3. (a) It is recommended that diagnostic and rehabilitation centers be developed in the larger areas of population for brief hospitalization of patients in acute stages of alcoholism. During this period the patients may be screened and directed to agencies for further rehabilitation and supervision. This arrangement would utilize the existing agencies of the community and be directed by a central supervising group which would follow the individual patient, through vocational guidance or training to productive occupation. Meanwhile close liaison by an established group of the various religious, social welfare, hospital, court and police agencies would need to be developed.

(b) It is suggested that convalescent units be established for vocational rehabilitation. A number of attempts to organize facilities have been made by several law enforcement agencies with indifferent success.

(c) It is suggested that individuals apprehended for intoxication, repeated inebriety, vagrancy, etc., be interviewed by a psychiatric social worker, or by a psychiatrist, in order that suggestions may be made to the court or law enforcement agency as to the appropriate procedure. Frequently, even superficial investigation may screen out individuals who are psychotic, inadequate or inclined toward dangerous asocial activities. Further study of such individuals may determine the need for close supervision or treatment, while others may be expected to profit from enforced abstinence from alcohol in a restrictive environment. During this confinement the patient should further be evaluated during the rehabilitation program, which includes vocational training, educational and individual psychiatric supervision.

Such a program would require the advice and direction of a visiting psychiatrist, the assignment of psychiatric social workers and clinical psychologists.

Many of the individuals requiring such aid and supervision are homeless men who will require long-continued direction. Following the period of such a rehabilitation program, the patient should

be directed to employment in a vocation for which he may be suited or trained. Alcoholics Anonymous has done much vocational placement work and, if properly subsidized, might be able to expand this function.

Such a plan has been in progress for some time at Castaic, California, under the supervision of the Sheriff's Office of Los Angeles County. A psychiatric social worker has been employed and arrangements for a full time psychologist are under way. Organized vocational training is in operation. This unit, however, has facilities for only 570 men who have been remanded there for numerous types of asocial activities besides alcoholism. The plan suggested for similar units would be restricted to individuals whose problem and whose apprehension were mainly due to their alcohol habit. New units should also be so developed and arranged that they may be properly equipped to accept individuals who have had no legal apprehension or who have committed no recognized misdemeanors. Such an arrangement should invite voluntary applications for treatment and rehabilitation.

Many alcoholics may be expected to benefit by psychotherapy in clinics where individual treatment and group therapy are available.

4. A broad educational program should be developed. This should include such fields of training as the following:

(a) Courses of *postgraduate training* for physicians and psychiatrists should be arranged for those actively engaged in this type of work. Symposia and lecture courses should be established for the general practitioner of medicine and the Program Committee of the California Medical Association should influence the presentation of papers and discussions on this problem. All available means of disseminating knowledge regarding the alcoholic, his personality and treatment should be directed by the Council of the California Medical Association through editorials and articles in the official medical publications of the profession.

(b) Training programs should be developed for auxiliary personnel such as psychiatric nurses, psychiatric and medical social workers and for attendants in hospitals, rehabilitation farms and convalescent units. Both universities and hospitals should be utilized in such training.

(c) Furthermore, training in the form of evening classes and lectures and in-service instruction should be provided for law enforcement workers and jail attendants. This is desirable in order to develop proper attitudes toward the alcoholics who come under their supervision.

(d) Public education concerning the problem of alcoholism is obviously important. This will require dissemination of relevant information and knowledge through the public newspapers and magazines. More academic discussions could be appropriately presented to lay groups as copies of published articles, by continuing supervised lecture courses and by specific talks to groups. Moving picture films

could usefully be prepared and shown to lay groups, depicting the effects of chronic alcoholism on the individual, its great economic and social cost and its importance in accident and crime. There should be proper medical and psychiatric technical supervision of any commercial films in which alcoholism is involved.

The younger generation should be instructed in the devastations of this disease, as the large majority of addicts begin the habit during adolescence. Dissemination of this information should be aimed at the junior high school years. Such instruction can readily be included in physical education, elementary physiology, biology and sociology classes.

Even elementary instruction concerning the effects of alcohol will aid the individual and, taught in school during the early teen years, will make a strong impression. Some of this knowledge will be discussed in the homes, with added potential effect. It is not generally recognized, even by physicians, how widespread and costly the use of alcoholic beverages has become. It is the duty of educational authorities to instruct pupils on this common and practical subject.

Dissemination of information to the public will improve the generally disinterested attitude toward excessive alcoholic indulgence. When the victim happens to be a member of the family, excuses and alibis are freely available while, on the other hand, when evidence of alcoholic excesses appears in strangers, no sympathy and little attention is offered. Such an individual is usually considered beyond the pale and entirely ostracized.

5. An active research program should be developed on the various phases of the problem of alcoholism. Such studies should embrace investigations in biochemistry and physiology as well as studies in the sociology and statistics of alcoholism. Clinical research in the fields of the psychiatry of alcoholism and techniques of treatments of the acute and chronic alcoholic are also needed.

6. In order to organize, develop and operate such an all inclusive program, some agency will have to be given administrative responsibility. In view of the developing complexities of state and local government it is the recommendation of your committee that some pattern be sought that will for the most part utilize existing agencies. The following pattern of administration is suggested as a possible approach to the problem:

Establish a new Division of Alcoholism within the State Department of Mental Hygiene, this division to be the central planning and coordinating agency within the state. In order to insure wide representation in the approach to the problem and close integration with other agencies in state government which are involved in this field, it is recommended that an Advisory Council on Alcoholism be appointed by the Governor. Such council should include as ex officio members the directors of the Departments of Mental Hygiene, Correction, Youth Authority, Public Health and Social Welfare,

together with at least five additional members from among candidates recommended by agencies involved. These are the California Medical Association, local law enforcement agencies, and hospital associations. Such an administrative plan would follow the general pattern developed within the State Department of Public Health for the administration of the Hospital Planning and Construction Program.

It is recommended that the Department of Mental Hygiene be authorized and funds be provided for the construction and operation of two hospitals attached to the two University of California medical schools, these hospitals to serve as research and clinical centers for the study and care of alcoholic patients. These centers could be operated by the Department of Mental Hygiene in close relationship with the teaching and research activities of the state medical schools.

It is recommended that, aside from these two clinical and research centers, local counties assume the responsibility of the development and operation of programs to care for alcoholics. A coordinating council at the county level comparable in representation to the State Council should be formed. Some local governmental agency should be authorized to be the administrative agency at the local level. It is imperative that the medical, law enforcement, social and judicial elements of the program be completely integrated at the local, as at the state level. In this manner the best knowledge, judgment and experience in all fields will be brought to bear upon the problem.

Adequate funds should be provided the State Division on Alcoholism to assist in the development of such local programs.

7. Financing the costs of the continued study of this problem would best be met by legislative allocation of a percentage of the excise taxes derived from the production and sale of the alcoholic products.

Statistical data have been offered to indicate the financial cost of excessive alcoholic indulgence, its influence upon accidents and the physical and mental effects on the individual. No one desires to see this continue. Even distillery advertisements recommend the use of alcohol in moderation. The fact remains, however, that among the large number of drinkers a predictable percentage inevitably become chronic alcoholics.

The cost of alcoholism, directly and indirectly, is a direct charge to the state and community. The actual amount spent for alcoholic beverages in the United States is more than 50 per cent in excess of that spent for public education. With such a large percentage of the population becoming diseased from the habit, public and administrative recognition must be stimulated. The wasteful expenditure of public funds in the apprehension and custodial care of alcoholic addicts, without a logical or systematic attempt to correct the situation, must be corrected.

The social waste from tuberculosis, venereal diseases, cancer and poliomyelitis has been recognized. More recently programs have been instituted for the study and dissemination of information regarding heart disease, diabetes, epilepsy and multiple sclerosis. But, no consistent organized program has been applied to alcoholism, which seriously affects a large segment of the population.

This problem of alcoholism must be met sooner or later. Four states have passed legislation designating funds for the study of this subject and treatment of the addict. The costs of administration would soon be offset by the savings in court, police and jail expenses.

8. Conclusions:

This report is presented as a preliminary consideration of the problem of alcoholism, with a view to appropriate recommendations to the Council of the California Medical Association.

Dissemination of knowledge concerning the subject to the membership of the California Medical Association is stressed. Through the influence of the physician, it is anticipated the public will develop proper attitudes toward alcohol, its use and abuse.

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CASE REPORTS

- ◀ The Symptomatic Treatment of Paralysis Agitans with Benadryl: Report of Two Cases
- ◀ Acute Volvulus of the Cecum—A Method of Diagnosis, with Report of a Case
- ◀ Niemann-Pick's Disease and Its Relationship to the Lipoidoses

The Symptomatic Treatment of Paralysis Agitans with Benadryl: Report of Two Cases

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THE purpose of this presentation is to call attention to the value of Benadryl in cases of paralysis agitans and to report the effects of the drug on two cases.

There is no known specific cure for paralysis agitans, or Parkinson's disease, and treatment has consisted of symptomatic relief only. The control of the distressing symptoms in this chronic and progressive disorder of the corpus striatum and extrapyramidal motor system has been difficult and often unsatisfactory. The drugs chiefly used are those in the atropine group, but other drugs that show possible elements of effective response, such as amphetamine sulfate, Benzedrine,[®] have been tried, with various degrees of success. One of the most recent additions is the anti-allergic drug Benadryl.[®]

Extensive investigations on the pharmacological effects of Benadryl have shown that the drug elicits an atropine-like response, and therefore its action in Parkinson's disease may be similar to that of other parasympathetic-inhibitory drugs. Among investigators who have described this response are Code² and Harris, McGavack and Elias.³

Benadryl was first tried empirically on a patient with paralysis agitans in 1946 by Budnitz¹ with gratifying results. In 1947, McGavack, Elias and Boyd,⁴ in experimental studies on the use of Benadryl, noticed that three out of four patients with this disease were benefited by the prolonged use of the drug. They believed that the change in tremor and work performance were not entirely accounted for on a psychic basis alone.

In 1948, Budnitz¹ reported the use of Benadryl in ten cases of Parkinson's disease. In all these cases improvement was noted, and although the degree varied from slight to pronounced, each of the ten patients noted good results at one time or another. Moreover, previously tried courses of the atropine group of drugs had not given a similarly satisfactory response. Budnitz believed that the reaction to Benadryl was not a suggestive or psychic one, but a true therapeutic response.

CASE REPORTS

CASE 1: A 64-year-old mail clerk had been "nervous" for over ten years. He had noticed tremor of his hands and head, and, during the previous six years, a tendency to fall easily. He had previously been treated with "drops" (belladonna), but had not noticed significant improvement and had discontinued use of the drops after about a year. The pertinent findings at the first visit in July 1947 were the continuous shaking of the head, typical pill-rolling tremor in the hands and stiffness in all extremities, with difficulty in walking.

A course of Rabellon[®] (compound of belladonna alkaloids) was started, four tablets daily for five months, without any benefit. The patient was not seen again until eight months later, feeling more nervous and shaky. Scopolamine, 0.6 mg., was given three times daily beginning in July 1948. This medication was maintained for four months, and slight improvement was noted. In November 1948, the patient was put on 25 mg. of Benadryl three times daily, in place of the scopolamine. After one week, he felt significantly less nervous and the shaking was clinically diminished. The dosage was increased to 50 mg. four times daily, and in two weeks the patient no longer complained of nervousness, said he felt less tired in doing his work at the post office, and was able to write letters with a much steadier hand. (Formerly, writing had been a severe ordeal.) There was only a little drowsiness from the Benadryl. The medication was continued and four months later the improvements were being maintained.

CASE 2: The patient, a 56-year-old retired merchant, had Parkinson's disease for nine years. For about two years he had been taking scopolamine, which had apparently controlled the rapid progress of symptoms, but when first observed by the author in October 1947, he was complaining that he had difficulty in locomotion and in the tremor of his hands. An attempt at better control was made by increasing the dosage of the scopolamine from 0.4 to 0.6 mg. three times daily. This was maintained for approximately six months, but no significant change was noted. Another increase, to 0.6 mg. four times daily, was then tried, and the general rigidity seemed to be lessened.

In August 1948, Benadryl, 200 mg. daily, was begun and the scopolamine was continued. In a few days, the patient said he felt greater improvement than ever before, and when he was observed after two weeks, definitely greater ease in walking and a lessening of the tremor in the hands were noted. There was no complaint of drowsiness. In October 1948 the scopolamine was withdrawn and only Benadryl was given. During five months of observation thereafter, discontinuance of the scopolamine made no noticeable difference.

COMMENTS

Experience in the two cases here reported seems to add to evidence already reported,¹ by Budnitz and others, that Benadryl gives significant benefit to patients with Parkinson's disease. Admittedly, the action of the drug is not too well understood, and its use may be empirical. However, the atropine-like effect may explain why satisfactory results occur. Moreover, there seems to be a synergistic action between Benadryl and the parasympathetic-inhibitory drugs, as seen in several of the cases reported by Budnitz, in which the patients did well on the use of Benadryl and one of the other drugs simultaneously. This observation in itself may be of importance with regard to those patients who do not respond to the administration of only one drug.

Whether other similar anti-allergic drugs would give the same action in such patients is not yet known. However, in one of the cases reported by Budnitz, Pyribenzamine was substituted for Benadryl and the improvement gained was lost. Benadryl was then resumed, with a return of relief in three days.

SUMMARY

Two cases in which patients with paralysis agitans were maintained on Benadryl are reported. Partial relief of symptoms referable to the disease was noted in both patients.

Benadryl seems to be of benefit in cases of paralysis agitans, either as a therapeutic agent in itself or as a synergist with another drug of the parasympathetic-inhibitory group, or both. No significant untoward reactions have been demonstrated.

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Acute Volvulus of the Cecum—A Method of Diagnosis, with Report of a Case

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ACUTE volvulus of the cecum is a rarely encountered clinical entity. Fewer than 400 cases have been reported in the literature since the disease was first described by Rokitsky¹ in 1837. It is remarkable that the great majority of these cases have been reported from Russia and the North European countries. To date, no satisfactory explanation has been offered as to this unusual geographical distribution. The lesion has been estimated to be accountable for from 1 per cent to 11.6 per cent of all cases of acute intestinal obstruction, not including strangulated external hernia. The figure of 1 per cent represents that given by American observers. There appears to be no characteristic age incidence, but the disease occurs oftener in males than in females, in a ratio of 3:1. In the older reports of series of cases, mortality figures were as high as 50 per cent where the patients were treated surgically, and as high as 100 per cent with conservative treatment. Today a fair generalization is that the longer operative intervention is delayed, the higher will be the operative morbidity and mortality.

CASE REPORT

A 37-year-old native American housewife entered the hospital at 6 p.m. on November 12, 1947, complaining of cramping abdominal pain which had been present since 10 o'clock the previous night. The family history was non-contributory. The patient had never been pregnant, never had an opera-

tion, and her general health had been fairly good, although she was quite thin and had never been able to properly gain weight. She stated that she had had no previous attacks of this character but for the preceding two or three weeks had been having two or three loose bowel movements each day, with some mild cramping. There had been no blood or mucus in the stool. The present pain developed suddenly and had persisted, with frequent cramplike exacerbations. The patient said she had vomited four times before entry and had noticed distention of the abdomen.

Findings on physical examination were essentially normal, save for the abdominal findings. The blood pressure was 150 mm. of mercury systolic and 90 diastolic. The abdomen was moderately distended, with a sausage-shaped mass present in the mid-lower quadrant running transversely across the abdomen from right to left just below the umbilicus. The abdomen was diffusely tender and there was pronounced rebound tenderness.

Roentgenograms taken at this time showed a large closed-loop type of bowel obstruction, and it was the authors' opinion that there was volvulus of either the cecum or the sigmoid colon. A Harris tube was passed orally and a colonic flush given rectally, with no relief of the distention. Fluids were given intravenously. The blood count taken at this time showed 3,800,000 erythrocytes with hemoglobin value of 80 per cent, and 10,500 leukocytes with 89 per cent polymorphonuclear cells.

Because there was some difficulty in persuading the patient's family to permit operation, this had to be postponed until the following morning. During the night the cramplike abdominal pain continued and a roentgenogram taken early on November 13, 1947, showed an increase in size of the dilated closed loop of bowel.

The patient was given a transfusion of blood, and when the peritoneal cavity was opened a moderate amount of serosanguineous fluid was found to be present. A large mass about the size of two fists lay transversely in the abdominal cavity at the level of the umbilicus. This mass consisted of the cecum and the proximal half of the ascending colon,



Figure 1.—Twelve hours after onset of pain. Note dilated loop of large bowel lying on left side of abdomen.

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which had rotated clockwise upon itself for 180 degrees. The walls of the cecum and the colon were red and edematous, but no actual gangrenous areas were present. The ileum appeared normal and there were no large nodes present in



Figure 2.—Sixteen hours after onset of pain. Loop still on left side, larger and ascending in abdomen.



Figure 3.—Twenty-four hours after onset of pain—loop not relieved by intestinal intubation.

the mesentery of the ileum. The remainder of the abdominal viscera were normal, including the large bowel which was patent throughout beyond the site of the twist. The volvulus was easily untwisted. No attempt was made to fix the cecum or colon, due to the poor condition of the bowel wall. Following the release of the volvulus, pressure on the dilated cecum sent large quantities of gas coursing through the large bowel. Immediately following the operation a check-up x-ray film of the abdomen showed adequate air throughout the large bowel, with relief of the obstruction.

DISCUSSION

In the authors' opinion, volvulus of the cecum and ascending colon, one of the rarer causes of acute intestinal obstruction, is a disease which in many instances can be properly diagnosed before operation. This is contrary to the views of most of the authors of recent papers on the subject. Sweet² stated that the "diagnosis is rarely made before operation or autopsy." The authors feel that two most important diagnostic aids are (1) the taking of a proper history and (2) a proper interpretation of x-ray films of the abdomen. In line with the taking of proper history, inquiry must be made as to previous attacks of sharp, cramplike abdominal pain accompanied on occasion by some distention and even occasionally by the presence of a lower abdominal mass. Since the pathological rotation and twisting of the ileocolic loop is dependent upon anatomical variations of malrotation, maldescent, or malfixation of the right portion of the colon, one may assume that this portion of the bowel might have been subject to volvulus of varying degrees at several previous times during the patient's life. When the episodes of pain and distention can be linked to preceding bouts of constipation, diarrhea, violent exercise, or sudden change of position, chronic or subacute ileocolic volvulus, with self-relief of the twist, should be suspected.

Early plain films of the abdomen are important, particularly in correlation with the history and physical findings. In all cases, intestinal volvulus becomes a closed-loop obstruction and rapid distention of the strangulated loop and



Figure 4.—Picture taken immediately following operation; obstruction relieved; air throughout large bowel.

of the abdomen then takes place. This is obvious early in the x-ray films. If the enlarged loop does not respond to the deflating measures of intubation with a Harris tube or enema and rectal tubes, suspicion of closed-loop obstruction should be aroused. In the case here reported the x-ray films, taken at ten-hour intervals, showed this quite well. They showed a gain in size of the closed-loop obstruction despite these measures. As a general rule, obstruction of the large bowel gives symptoms far less acute than does a high obstruction of the small bowel. However, when the large bowel obstruction is of the closed-loop variety, that is, a volvulus either of the ileocolic segment or of the sigmoid, the attendant symptoms are as rapid in onset and as severe in course as are those of upper small bowel obstruction. This too, then, is of diagnostic significance in volvulus of the large bowel.

It will be noted in the x-ray films that the dilated closed loop of obstructed bowel occupies the mid- and left lower quadrant of the abdomen, lying convexly to the left. This was borne out by the physical findings in the abdomen of the patient, the palpable mass lying transversely across the abdomen to the left. Because in by far the greater percentage of cases of volvulus of the cecum, the volvulus rotates in a clockwise direction to the left around the apex of the

lowest portion of the fixed ascending colon, it is easy to see the reason for this. Volvulus of the sigmoid colon presents no such picture. The large dilated closed loop in this syndrome rises from the pelvis from a triangular terminal area and balloons into a loop which may occupy any portion of the lower abdomen, right or left. Volvulus of the terminal portion of the ileum, which accounts for about 47 per cent of all cases of intestinal volvulus as against 42 per cent for volvulus of the cecum and 11 per cent for volvulus of the sigmoid colon, may cause some diagnostic difficulty. In fact, one roentgenologist who was consulted in the case here reported, read the films as volvulus of the lower portion of the ileum. In such circumstances x-ray films should be of assistance if the haustral markings of the colon can be made out. In addition, the colon will usually show larger fluid levels present at an early stage of obstruction than will the small bowel.

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Niemann-Pick's Disease and its Relationship to the Lipoidoses

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THE group of lipid diseases known as the xanthomatoses includes: (1) the primary type which is associated with cholesterosis, (2) the secondary type due to hyperlipemia, (3) the various types of xanthomatous deposits in tumors and inflammatory tissue, and (4) the metaplastic reticular and histiocytic diseases of Gaucher and Niemann-Pick which are associated with the specific lipid materials kersin and sphingomyelin respectively. To these might be added the condition of familial amaurotic idiocy or Tay-Sach's disease. The term xanthomatosis is an unfortunate one to use in

describing these diverse diseases. From its derivation it implies a yellow color such as that produced by cholesterol and bears no relationship to the various types of lipoids and lipochromes included under its heading. Pick himself¹ decried the term and suggested "lipoidosis" as a better one. Other authors^{2,3} feel that the term "xanthomatosis" should be restricted to those conditions in which cholesterol is the predominant lipid. The lipid nature of the chemical substances involved in the group is illustrated in Table 1.

The pathogenesis of Niemann-Pick's and Gaucher's diseases appears to be due to a disturbance of lipid metabolism, the nature of which is controversial. Improved methods of chemical fractionation of lipoids in tissues have added much to knowledge of the subject. Gaucher felt that the disease bearing his name was a splenic neoplasm. Pick⁴ suggested that hypercerebrosidemia with secondary storage of cerebrosides in the reticulum cells caused the condition, and he was the first proponent of the metabolic nature of this group of diseases. He also disagreed that Niemann-Pick's or Gaucher's disease represent lipid histiocytosis. Thannhauser⁵ and his associates elaborated the cellular theory,

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TABLE 1.—Chemistry of Lipoidoses

I. FATS: Glycerin	{ Fatty acid Fatty acid Fatty acid
II. LIPOIDS:	
A. STEROLS	
Cholesterol and its derivatives (Hand-Schuller-Christian)	
B. PHOSPHATIDS	
1. Glycerin	{ Fatty acid Fatty acid PHOSPHORIC ACID+choline=LECITHIN or +ethanolamine=CEPHALIN
2. Sphingosin	{ Fatty acid PHOSPHORIC ACID+choline=SPHINGOMYELIN (Niemann-Pick)
C. CEREBROSIDES	
Sphingosin	{ Fatty acid GALACTOSE=KERASIN (Gaucher)

TABLE 2.—*Chemical Analyses in Niemann-Pick's and Tay-Sach's Diseases (After Thannhauser)*
 Figures represent mg. per 100 cc.

	Spleen		Liver		Brain	
	Normal	Niemann-Pick's	Normal	Niemann-Pick's	Normal	Niemann-Pick's
Total cholesterol.....	1.8-2.4	3.10	2.0-2.6	3.78	7.3-15	9.90
Free cholesterol.....	1.6-1.1	1.36	1.0-1.1	0.47	1.3-4.6	4.10
Cholesterol esters.....	0.7-1.3	1.74	1.5-2.2	3.31	6.1-10.30	5.80
Total phospholipids.....	5.5-11.0	8.30	9.0-11.0	9.26	25-30	19.68
Sphingomyelin.....	0.7-1.0	1.04	0.3-0.5	0.55	4.5-7.0	7.04
Cephalin.....	1.5-7.0	4.80	3.0-5.5	0	12-25	
Lecithin.....	3.0-4.0	2.46	3.0-6.0	8.71	4.0-6.0	
Total fatty acids.....	4.0-6.2	5.97	8.6-13.0	27.40		

namely, that the metabolic processes involved are within the cells. There is considerable evidence to support their conception of the pathogenesis of these diseases:

1. In Gaucher's disease kersin is not increased in the serum.⁶

2. The kersin present is found only within the reticular cells themselves.

3. An imbalance of the enzymes cerebrosidase and phosphocholinesterase, normally present in cells, has been demonstrated,⁹ and this imbalance is associated with the abnormal formation of sphingomyelin or kersin as the case may be.

Niemann-Pick's disease is the rarest of these conditions. Up to 1945, 60 cases^{1, 2} had been reported. There were partial lipid analyses in 12 of those cases, complete lipid studies in nine. It is a disease of infancy, usually occurring in Jewish infants, is only slightly more frequent in females than in males² and terminates in death before the third birthday. In 15 of the 59 cases reviewed by Canmann¹ definite familial tendencies were shown. In common with other lipid storage diseases, there is the characteristic occurrence of large abnormal lipid-containing cells in various organs with enlargement of the liver and spleen. Clinically, it is frequently difficult to differentiate from Gaucher's disease. Other conditions which may confuse the diagnosis may be amaurotic familial idiocy (Tay-Sach's disease), von Gierke's disease, leukemia, and certain tumors of the liver (hepatoma, neuroblastoma). These latter conditions usually can be easily ruled out by clinical findings or suitable laboratory tests.

A case of Niemann-Pick's disease in the records of the Children's Hospital, Los Angeles, illustrates some of the factors involved in the clinical and pathological aspects of the lipid storage diseases.

CASE HISTORY

A seven-month-old Jewish male was admitted to Children's Hospital with eczema of the face and scalp of three months' duration. He had been born after a full term pregnancy and normal labor. At birth an enlarged liver and spleen were noted but the patient was otherwise normal. Birth weight was 7 pounds 5 ounces. He was the second child of normal parents and had a four-year-old brother in good health. The feeding history and weight gain had been satisfactory, but at four months the child was unable to hold up its head. A raised, scaly patch developed on the left cheek, and gradually spread to the face and scalp. Therapy had been of no avail, and at seven months of age the patient was unable to hold up his head or sit up.

Physical examination revealed a well nourished infant who showed little reaction to objects brought near his face. There was an erythematous papular rash, eczematoid in nature, over the left cheek and scalp, with excoriations due to scratching. Questionable separation of the sutures of the skull was noted on palpation. No teeth were present. The

heart was normal, but auscultation of the chest disclosed coarse wheezing rales bilaterally. The liver edge was palpable 4 to 5 cm. below the right costal margin, and the spleen was palpable also. Bilateral hydrocele was present. The skin over the legs, ankles and feet was cold and firm, and the soles of the feet were red.

Neurologic examination revealed that the pupils reacted to light, in spite of pronounced diminution in visual acuity. Nystagmus on lateral gaze was present. Fundoscopy by an ophthalmologist disclosed slight bilateral optic atrophy, and no cherry red spot of the macula was present. There was no rigidity or hypermotility of the extremities and, except for slight hypoaffective deep tendon reflexes, no other abnormality was noted.

Laboratory studies on admission: The urine was normal. A hemogram showed a hemoglobin value of 70 per cent, erythrocytes numbering 4.6 million, and leukocytes 10,200 with 56 per cent lymphocytes, 25 per cent polymorphonuclear cells, 11 per cent eosinophils and 8 per cent monocytes. Results of Kahn, Wassermann and tuberculin tests were negative. The blood cholesterol was 156 mg. per 100 cc.

A pneumoencephalogram was performed. No air entered the subarachnoid space; both lateral ventricles were enlarged, the left more than the right, with a "bat-wing" appearance; the third ventricle was also dilated. A skeletal survey showed the skull and long bones to be normal.

The child remained afebrile throughout the hospital stay of 11 days in spite of a slight upper respiratory infection near the end of the period. Repeated hemograms showed no essential change, although one smear hinted at vacuolization of the lymphocytes and monocytes. The child was discharged with no essential change in status.

Three days later he was readmitted with a flare-up of the eczema and an increase in severity of the respiratory infection. He was acutely ill with a temperature of 102°. The results of physical examination were essentially as before except for changes in the ears and chest. Both tympanic membranes were inflamed and the right chest was flat to percussion and inspiratory and expiratory crepitant rales were heard. An x-ray film of the chest disclosed consolidation in the right lung, and a hemogram revealed leukocytosis.

During the first week the temperature ranged from 102° to 105°. On the seventh day, myringotomy was performed bilaterally, with rapid defervescence. Culture of the pus obtained from the left ear showed staphylococcus aureus and pneumococcus type XXIII. For a week the child appeared much improved, but the fever rose again, with a progressive downhill septic course, and after one month in the hospital, the patient died.

At autopsy the positive findings consisted of emaciation, dehydration and multiple eczematous lesions of the scalp. The right lung was bound to the parietal pleura by dense fibrous adhesions, and some pus pockets were found among them. The liver extended 7.5 cm. below the costal margin,

and the spleen 3 cm. below the left costal border. The heart was hypertrophied and weighed 60 gm. (normal weight for the age, 37 gm.). The right lung showed fibrous tags on the pleural surface and almost complete consolidation. The liver weighed 525 gm. (normal weight, 260 gm.). The surface was smooth, glistening and yellowish brown. The lobular architecture was indistinct. The cut surface was glistening in appearance. The spleen weighed 30 gm. (normal weight, 20 gm.). The surface was purple, smooth and glistening. The pulp scraped readily with a knife. The malpighian bodies were quite prominent. Both kidneys were enlarged, somewhat paler than normal. There was a thrombus in the left renal vein. Bilateral hydrocele was present. The brain weighed 870 gm. (normal weight, 750 gm.). The meningeal vessels were engorged. There was atrophy of the convolutions of the left cerebral hemisphere, particularly in the temporal and parietal regions around the sylvian fissure. The left lateral ventricle was larger than the right and the third ventricle was considerably dilated, measuring 1 cm. in its transverse diameter and 2.5 cm. in the vertical diameter. The cerebellum was not remarkable. Other organs were grossly negative.

Positive microscopic findings included acute bronchopneumonia. In addition, there were large foamy-appearing cells in alveoli and in alveolar walls. The liver parenchyma was displaced by foci of large vacuolated cells. The splenic architecture was obscured by numerous large pale foamy cells (Figure 1). Similar cells were noted in the adrenal cortex. The thymus, lymph nodes, kidneys and sections from the large and small intestine showed infiltrations with foam cells, and the bone marrow was diffusely infiltrated with similar cells (Figure 2). Sections from various portions of the brain showed ganglion cells that were pale, swollen and granular. Some of these were enlarged three to four times normal size; others were slightly larger than normal, but showed definite vacuolization of the cytoplasm and club-like ends. The nuclei, when present, had a tendency to be pushed to one side. Many large foamy cells in which no nuclei could be identified were present. They were usually in the vicinity of the ganglion cells, but it could not be definitely determined whether they represented ganglion cells (Figure 3). There was no inflammatory reaction. The ependyma was not remarkable. The meninges were essentially normal. No evidence of necrosis of any of the cerebral or cerebellar tissue was noted. Smith-Dietrich stains of the foam cells gave a positive reaction. Unfortunately chemical analyses of the organs were not made.

DISCUSSION

In the case presented there were neurologic signs suggestive of Tay-Sach's disease. This is not a unique finding in Niemann-Pick's disease and has led to considerable speculation concerning a common etiology. In general the points of similarity in the two conditions are: (1) Occurrence in infancy, (2) high incidence in Jews, (3) familial constitutional character, (4) loss of motor and physical functions, (5) lipoidal character of cells in central nervous system, (6) macular degeneration (cherry red spot) in certain cases of Niemann-Pick's disease, (7) absence of macular degeneration in certain cases of Tay-Sach's disease.

Factors against a common pathogenesis in the two diseases are: (1) Involvement of bone marrow, liver, spleen, lymph nodes and other organs as well as the brain in Niemann-Pick's, but not in Tay-Sach's disease, (2) absence of descending degeneration of neurons in Niemann-Pick's disease, (3) differences in lipid analysis of various organs from the two conditions.

The diagnosis of this group of diseases is dependent upon a correlation of the clinical findings and pathological studies,

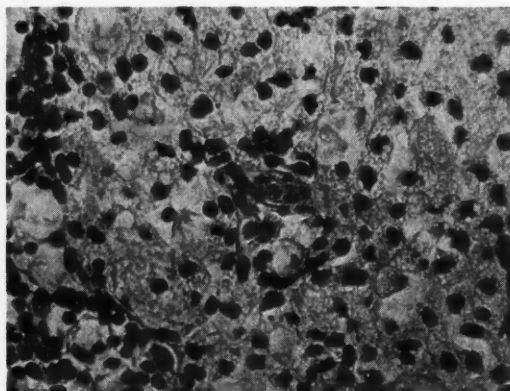


Figure 1.—High power view, spleen, showing large foamy cells.

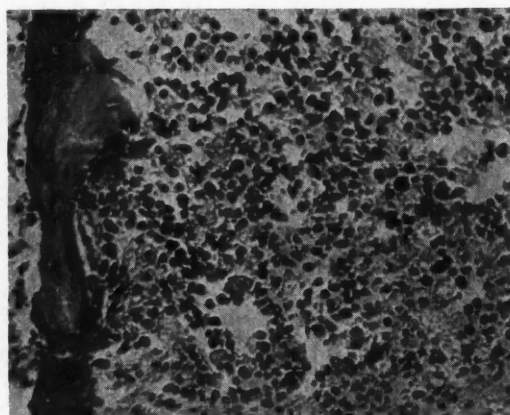


Figure 2.—Bone marrow, sternum, showing almost complete replacement by foam cells.

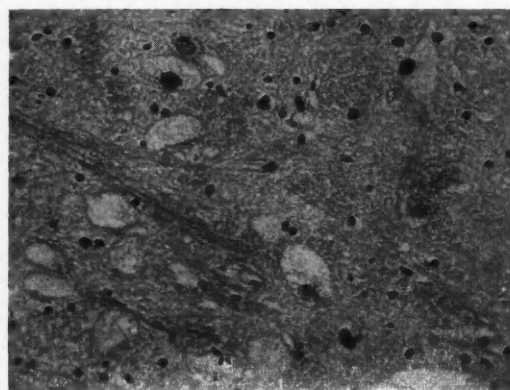


Figure 3.—Medulla, showing swollen foamy ganglion cells, some with foamy granular nuclei.

including chemical analysis. Bone marrow study during life usually points out the lipid nature of the disease, and frequently suggests the disease in question. Hence it is of great importance. Postmortem examination shows the sites of lip-

oid deposit, and often by means of appropriate staining techniques, a diagnosis is made. Chemical analysis of the organs is of the greatest importance, and it is interesting to note that lipid fractionations have been done in so few cases. Data derived from this technique will add to knowledge of the mechanism of variations of this class of disorders, and the ultimate diagnosis should depend on such an analysis.

SUMMARY

A case of Niemann-Pick's disease is presented. The findings in the brain closely resembled those described in Tay-Sach's disease. A discussion of the essential lipoid diseases is presented, and the importance of chemical fractionation of the visceral lipoids is stressed.

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EDITORIALS

A.M.A. Clinical Session

On December 9 the American Medical Association rang down the curtain on its third Clinical Session, this one having been held in Washington, D. C. The meeting, a complete dress rehearsal for the coming Annual Session, included this year not only sessions of the House of Delegates, but also scientific meetings, scientific exhibits and technical exhibits. It was well attended and those present appeared satisfied with the results attained.

In the House of Delegates, three items loomed out above all else. These were (1) the demand to broaden and strengthen the A.M.A.'s office in Washington, (2) the establishment of dues of \$25 a member for 1950, and (3) the reiteration of the principles in the Hess Committee report adopted at the 1949 Annual Session last June. The first two of these are in direct confirmation of the public educational program of the A.M.A., first as a means of implementing the program and second as a means of financing it. The Hess Committee report will be dealt with separately in this issue.

The demand for improving the Washington office situation was heard throughout the meeting, and the House of Delegates tackled the problem realistically. The A.M.A. has maintained an office in the national capital for several years, primarily as a listening post; the membership is now asking, through its elected delegates, that the office pursue a more vigorous program. It is hoped that bills can be more promptly analyzed and that the A.M.A. position with regard to specific legislative proposals can be quickly and effectively implemented. Some members of the House of Delegates look askance at such activities on the grounds that they constitute

lobbying. On the other hand, it should be borne in mind that "lobbying" is subject to a variety of definitions and interpretations, not only in dictionaries but in state laws as well. In its truest sense, that of representing group opinion, it constitutes nothing more than the exercise of the right of appeal to the government, which is guaranteed Americans under the Bill of Rights.

To implement the decision regarding the Washington office, it was voted to set up a committee of members of the Board of Trustees and of the House of Delegates, similar to the Coordinating Committee which has been so successful in advising and guiding the national education campaign. The roster of this committee has not yet been announced but it is understood to comprise men of unquestionable standing and capability.

The adoption of \$25 annual dues for members of the A.M.A. for 1950 puts into practical application the principle adopted a year earlier, when the euphemism of "assessment" was used; this year, backed by the overwhelming numbers of members who had gladly and willingly paid the 1949 "assessment," the House of Delegates in the interest of uniformity voted dues. The sum in prospect from these dues is estimated as sufficient to permit the A.M.A. to carry on its public education campaign.

In the decisions to strengthen the Washington office and to collect dues, the A.M.A. took two positive strides forward in the Clinical Session. The carrying out of these procedures will let the American people and the Congress know that medicine knows its business and is going to carry it out as a public trust in the interest of better public health.

The Hess Committee Report

One of the most-discussed items at the recent A.M.A. Clinical Session was the report of the Hess Committee of June 1949. This committee had been given the task of considering ways and means of dealing with hospitals which were, in effect, practicing medicine. The hospital departments primarily concerned were those of radiology, pathology and anesthesiology. In these departments, in some hospitals, medical services were actually being sold to hospital patients at a greater fee than was paid to the physician rendering the service.

The Hess Committee reported to the 1949 annual A.M.A. session with the suggestion that Item V(3) of the "Essentials of a Registered Hospital," adopted by the A.M.A. Council on Medical Education and Hospitals, be enforced. This item reads: "It shall not be the policy of the hospital to make a profit from the department of radiology." While the statement applies directly to radiology, the principle behind it is equally aimed at all branches of medical practice.

To implement this provision, the Hess Committee recommended that the Judicial Council of the A.M.A. be empowered, upon due action by county and state medical associations, to determine which of the members of the A.M.A. were unethical or which hospitals might be violating the clause. The Judicial Council, in the latter instance, would report to the Council on Medical Education and Hospitals, which would have the power to remove the name of the hospital from its registration list.

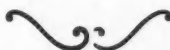
On consideration of this recommendation, the Board of Trustees sought legal advice and was given an opinion which held that such a procedure might

be in violation of legal statutes. The board thereupon recommended to the House of Delegates that the Hess Committee report, which had been adopted by the 1949 House of Delegates, be rescinded. That was the question before the Clinical Session.

After considerable discussion before the Trustees and before a reference committee, the House of Delegates was given the recommendation that the Hess Committee report be reconsidered, not rescinded. On a substitute motion, the reference committee's report was amended to provide that the original Hess Committee recommendations not be put into effect until after the 1950 Annual Session and that, prior to that time, legal aspects of the matter be reconsidered by the original Hess Committee for report to the 1950 House of Delegates. This amendment was adopted unanimously.

The interesting portion of the amendment is the statement which *reiterates the belief of the House of Delegates in the theory underlying the original report and the principles enunciated in it*. The House of Delegates has placed itself squarely on record that the practice of medicine is a personal professional activity and not a proper corporate endeavor. If radiology, pathology and anesthesiology have already succumbed, what is to prevent surgery, obstetrics and general practice coming next?

We will await with great interest the recommendations of the reappointed Hess Committee on ways and means of implementing the original report without infringing any statutes in so doing. It is sincerely to be hoped that a clear-cut answer on this question may be found and adopted.



Letters to the Editor . . .

"Non-Paralytic Poliomyelitis"

From cases diagnosed as "non-paralytic poliomyelitis," "aseptic meningitis" or "fever of unknown origin," a new virus of current epidemiologic interest has been isolated by Melnick² and associates of the department of pediatrics, Yale University.

During the 1948 poliomyelitis epidemic in southern New England, feces were collected from 16 typical cases of non-paralytic illness. Injected intracerebrally into rhesus monkeys, all samples proved negative for poliomyelitis virus. Adopting the technique previously used by Dalldorf,¹ the samples were also tested on newborn mice. Swiss mice one to three days old were injected intracranially or intraperitoneally with each of the 16 samples. After an incubation period of two to ten days signs of disease developed in seven mice, manifested by weakness, ataxia and paralysis of one or more legs. Death usually took place within 24 hours.

In each case the outstanding necropsy finding was an extensive myositis of the skeletal muscles, especially in the limbs. In most of the cases lesions were also noted in the heart muscle and the brain.

Inoculation experiments on newborn mice showed that the infectious agent was present in the brain, skeletal muscles, heart, liver, spleen and intestinal contents. Aerobic and anaerobic cultures yielded no bacterial growth. Since the agent was readily passed through a Corning bacterial filter, it was presumably a virus. Sedimentation tests suggested that it is one of the smallest viruses. At 18,000 r.p.m. for 30 minutes but little virus is thrown down. From the resulting clear supernatant fluid, the agent was readily sedimented at 36,000 r.p.m. for 60 minutes.

The virus is neutralized by the convalescent serum of patients from which it was isolated, and by homologous antiserum prepared by repeated inoculation into animals. It is not neutralized by antiserum from animals hyperimmunized against polio-

myelitis virus, mouse encephalomyelitis, mumps, herpes, lymphocytic choriomeningitis, encephalomyocarditis, louping ill, equine encephalitis, or Newcastle disease.

The new virus is non-infectious for rhesus monkeys and for adult mice. After oral administration to chimpanzees no recognizable symptoms develop. However, the virus may be recovered from their throat washing for eight days, and from their feces for as long as 12 days. Neutralizing antibodies absent before the oral administration are demonstrable on and after the 14th day.

One presumptive accidental human infection took place in Melnick's laboratory. One physician working with the new virus developed a "fever of unknown origin" lasting for eight days. His only noticeable symptom was a slight stiffness of the back. The new virus was repeatedly recovered from his feces and nasopharyngeal washings. Specific antibodies developed during his illness, reaching a neutralizing titer of 10,000 during convalescence.

Both the new virus and poliomyelitis virus have been recovered from pooled fecal samples collected in 1947 in Akron, Ohio, and in 1948 in Winston-Salem, N. C. The new virus has also been found in sewage collected in 1948 in Connecticut and North Carolina and in non-biting flies collected in Connecticut, North Carolina and Texas.

Cross neutralization tests have shown that there are at least two immunologically distinct strains of the new non-polio mouse-infecting virus. The Texas and North Carolina strains are apparently identical. Both are distinct from the Connecticut strain.

Recognition of Melnick's non-polio non-paralytic virus as a possible diagnostic hazard in polio epidemics is of major clinical interest.

REFERENCES

1. Dalldorf, G., and Sickels, G. M.: *Science*, 108:61, 1948.
2. Melnick, J. L., Shaw, E. W., and Curnen, E. C.: *Proc. Soc. Exp. Biol. and Med.*, 71:344, July 1949.

W. H. MANWARING, M.D.
Stanford University, Calif.



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NOTICES AND REPORTS

A.M.A. Dues - 1950

Dues of \$25 a member were voted by the American Medical Association for 1950 at the December Clinical Session in Washington. The manner of collection and reporting of dues is left up to the component state associations.

In California the same method will be used as in 1949, namely, the collection of the A.M.A. dues by the county society secretaries, along with county and state dues. Under this procedure in 1949, California ranked right up in front in the percentage of collections. This same proud position must be maintained in 1950.

The A.M.A. national campaign has made remarkable strides in its public educational work in 1949. In crucial 1950, the good work is to be kept up and California's good name must be preserved in the financing of this all-important work.

Council Meeting Minutes

Tentative Draft: Minutes of the 366th Meeting of the Council of the California Medical Association at the St. Francis Hotel, San Francisco, November 20, 1949.

The meeting was called to order by Chairman Shipman in Room 210 of the St. Francis Hotel, San Francisco, at 9:30 a.m., Sunday, November 20, 1949.

Roll Call:

Present were President Kneeshaw, Speaker Alesen, Vice-Speaker Charnock, Councilors Shipman, Ball, Crane, Henderson, Anderson, Ray, Montgomery, Lum, Pollock, Green, Bailey, West, MacLean, Frees and Thompson; Secretary Garland and Editor Wilbur. Absent, President-Elect Cass (illness).

A quorum present and acting.

Present by invitation were Dr. D. H. Murray, chairman of legislation; John Hunton, executive secretary; William P. Wheeler, assistant executive secretary; Howard Hassard, legal counsel; Ed Clancy, field secretary; Ben H. Read, executive secretary of the Public Health League of California; county society executive secretaries Frank Kihm of San Francisco, Rollen Waterson of Alameda, Glenn Gillette of Fresno, Vance Venables of Kern and Kenneth Young of San Diego; Mr. William M. Bowman, executive director of California Physicians' Service; Dr. Wilton L. Halverson, state director of public health; Messrs. Ned Burman and Clem Whitaker, Jr., of public relations counsel.

1. Minutes:

(a) On motion duly made and seconded, minutes of the 365th meeting of the Council, held September 24, 1949, were approved.

(b) On motion duly made and seconded, minutes of the 216th meeting of the Executive Committee, held November 10, 1949, were approved. (One item was held in abeyance but adopted by subsequent action.)

2. Membership:

(a) A report of membership as of November 18, 1949, was received.

(b) On motion duly made and seconded, 65 members whose 1949 dues had been received since the last Council meeting, were voted reinstatement as active members.

(c) On motion duly made and seconded in each instance, five members were elected to Retired Membership. These were:

Fresno County: Edwin Leland Mott.

Los Angeles County: Blanche C. Brown, Wilbur Lucas, Charles T. Sturgeon, Percival M. Williams.

(d) On motion duly made and seconded in each instance, 15 applicants were elected to Associate Membership. These were:

Alameda County: Herbert K. Abrams, John C. Dement, Arthur C. Hollister, Jr., Samuel J. Kimura, Henry G. Mello, E. Richard Weinerman.

Fresno County: Lee A. Stone.

Napa County: Willard B. Morell.

Orange County: Raymond Cecil Leer.

San Diego County: John Benvenuto.

San Francisco County: Morris Berk, Aaron E. Davis, Barbara Mullen, James Walsh Martin, Edith Sappington.

(e) On motion duly made and seconded in each instance, five applicants were granted a reduction of dues because of postgraduate study or protracted illness. These were:

Kern County: Leland S. Lewis.

Los Angeles County: Elwin Iris Conner, Irving Krakower.

Sacramento County: M. W. Haworth.

San Bernardino County: John Newell Little.

(f) In response to an inquiry, legal counsel stated that a new applicant for membership could not be elected and simultaneously granted a reduction of dues but could be elected to active membership and subsequently apply for a dues reduction.

3. Financial:

A report of bank balances as of November 18, 1949, was received and ordered filed. The executive secretary pointed out that \$100,000 in U. S. Treasury bills was not needed at this time for operating expenses and it was regularly moved, seconded and voted to transfer this amount to the Trustees of the California Medical Association for investment in U. S. Treasury 2½ per cent bonds.

4. Committee Reports:

(a) Committee on Hospitals, Dispensaries and Clinics: This committee presented a report on the question of members of the Association serving as faculty members in a school of licentiates in another of the healing arts. After discussion it was regularly moved, seconded and voted to refer this matter to the Committee on Medical Education and Medical Institutions for further study.

(b) Blood Bank Commission: A report was read from Dr. John R. Upton, chairman of the Blood Bank Commission, to the effect that agreement had been reached on establishment of a tri-county community type blood bank in Santa Barbara, to serve Santa Barbara, Ventura and San Luis Obispo counties.

(c) Advertising Committee: Advertising offered to the Journal was submitted for consideration as to appropriateness and it was regularly moved, seconded and voted to recommend against its acceptance.

(d) Special Committee on Public Funds for Hospital Construction and Care of Indigents Through Private Facilities: This committee (Kneeshaw, Garland, Hassard) presented a proposed statement of principles on the use of state or federal funds for hospital construction, which, upon motion duly made and seconded, was adopted. A copy of this statement is appended hereto and made a part of these minutes.

The committee presented a second statement relative to the use of private facilities for the care of indigents whose responsibility rested in the coun-

ties. It was regularly moved, seconded and voted that all Councilors forward to the Secretary their comments and suggestions on this statement, for the consideration of the committee for reporting back to the next Council meeting.

(e) Executive Committee: The Secretary presented the recommendation of the Executive Committee for creation of an over-all Committee on Public Health and Public Agencies, the function of which would be to oversee and correlate the activities of existing committees under a plan of scope and activities to be developed. Such a plan is attached hereto and hereby made a part of these minutes. On motion regularly made and seconded, it was voted to create this committee, the membership of which is to be L. A. Alesen, chairman, C. V. Thompson and F. E. West, with the Council Chairman and the Secretary ex-officio with the power of vote.

(f) Benevolence Committee: Dr. Anderson gave a progress report in which he suggested a closer cooperation between the Benevolence Committee and the Los Angeles County Physicians' Aid Association. He discussed an increase in the amount allocated to the Benevolence Fund out of dues and asked that the Council consider at a future date the advisability of participating in plans being laid by the Los Angeles County Physicians' Aid Association for construction of a permanent home for needy physicians.

(g) Special Committee on Health Insurance Proposal: Dr. Lum, chairman (Ray and Ball, members) gave a progress report on a meeting with representatives of labor and insurance brokers relative to a proposal to establish a standard type of voluntary health insurance policy at a set schedule of fees for those below an established income ceiling. It was regularly moved, seconded and voted to authorize the committee to continue such discussions with this and other insurance groups.

5. California State Department of Public Health:

Dr. Wilton L. Halverson, State Director of Public Health, expressed pleasure at the appointment of the over-all Committee on Public Health and Public Agencies and invited the members to attend meetings of the State Board of Health. He reported that he had given the 1951 legislative plans of his department to the Assembly Interim Committee on Public Health, including (a) rabies control legislation, (b) modernization of code sections on communicable diseases, (c) modernization and revision of vital statistics legislation, and (d) revision of the clinical laboratories act.

Mr. Hassard referred to his earlier report on the Crippled Children's Act, on which he had conferred with Dr. Halverson, and it was agreed to turn this matter over to Dr. Alesen's committee.

6. Proposal for Creation of Section on Diseases of the Chest:

A proposal to establish a scientific section on diseases of the chest was discussed and it was regu-

larly moved, seconded and voted to refer this to the Committee on Scientific Work.

7. Proposal for Committee on Nursing Problems:

A proposal to establish a committee on nursing problems was discussed and it was agreed to refer this to the Committee on Public Policy and Legislation. On motion regularly made and seconded, it was voted to meet informally with nurse representatives to discuss matters of mutual interest.

8. World Medical Association:

Dr. John W. Cline, one of the A.M.A. representatives in the World Medical Association, described the objectives of the organization and requested an appropriation of funds to help defray its expenses. On motion regularly made and seconded, it was voted to contribute \$1,000 to the World Medical Association.

9. Public Policy and Legislation:

Dr. Murray and Mr. Read reported on the results of the recent election and discussed legislation now pending in Congress. It was regularly moved, seconded and voted to send a letter of commendation to Judge Gus Jones of the Arkansas Circuit Court on his stand against misuse of government police powers.

On motion duly made and seconded, it was voted to send explanatory material to the county medical societies, with the request that they discuss with their own Congressmen the issues in S. 1411 and S. 1453.

10. American Public Health Association:

Dr. William P. Shepard reported on the recent annual meeting of the American Public Health Association, at which he was one of two representatives of the Association.

11. Committee for Cooperation with Health Agencies:

Dr. John W. Cline, chairman, gave the report of this committee, which, upon motion duly made and seconded, was approved. The report is attached hereto and hereby made a part of these minutes.

12. Public Relations:

Messrs. Ned Burman and Clem Whitaker, Jr., of public relations counsel reported on the progress of the A.M.A. public education campaign.

13. Industrial Medical Fees:

Dr. MacLean gave the report of the Executive Committee on its meeting with insurance representatives and it was regularly moved, seconded and voted to authorize the committee to continue its negotiations for a new fee schedule.

14. A.M.A. 1953 Annual Session:

On motion duly made and seconded, it was voted to issue an invitation to the American Medical Association to hold its 1953 Annual Session in San Francisco.

15. Pomona College Institute of Public Affairs:

On motion duly made and seconded, it was voted to contribute \$200 toward the expense of the Pomona College Institute of Public Affairs for a scheduled meeting to discuss private enterprise.

16. Manual of Joint Measurement:

The executive secretary reported that arrangements had been made for the publication of a manual of joint measurements for industrial injury cases, and it was regularly moved, seconded and voted to approve the proposed contract of publication.

17. Committee on Rural Health:

Dr. Carroll B. Andrews, chairman, requested authority for himself and a committee member to attend the A.M.A. rural health conference to be held in Kansas City in February 1950, and it was regularly moved, seconded and voted to authorize such attendance.

18. Sale of Antihistaminics:

A request to investigate the sale of antihistaminics because of their potential danger to automobile drivers and others was ordered referred to the Committee on Health and Public Instruction.

19. New Mexico Physicians' Service:

The executive secretary reported that a financial report of New Mexico Physicians' Service had been promised for early delivery and that it would reportedly show evidences of repayment of some of the funds advanced by the Association.

20. Committee on History:

Dr. George H. Kress, Honorary Historian, requested an appropriation of \$600 for stenographic services and it was regularly moved, seconded and voted to approve this expenditure.

21. Insulin for Diabetes:

On motion regularly made and seconded, it was voted to instruct the secretary to prepare a memorandum in opposition to the publication of advice to discontinue the use of insulin in diabetes.

Adjournment.

There being no further business to come before the meeting, it was adjourned at 6:30 p.m.

SIDNEY J. SHIPMAN, M.D., *Chairman*
L. HENRY GARLAND, M.D., *Secretary*

In Memoriam

ABRAMSON, MAX JACOBS. Died in Los Angeles, November 12, 1949, aged 68, of chronic myelogenous leukemia. Graduate of the College of Physicians and Surgeons, Los Angeles, 1911. Licensed in California in 1911. Dr. Abramson was a member of the Los Angeles County Medical Association, the California Medical Association, and a Fellow of the American Medical Association.

ANDERSON, HARRY ELLEN. Died in Culver City, October 26, 1949, aged 52, from a cerebral hemorrhage. Graduate of the College of Medical Evangelists, Loma Linda-Los Angeles, 1924. Licensed in California in 1924. Dr. Anderson was a member of the Los Angeles County Medical Association, the California Medical Association, and a Fellow of the American Medical Association.

BABCOCK, DONALD TISDALE. Died in Los Angeles, November 2, 1949, aged 52, from acute pancreatitis. Graduate of the Emory University School of Medicine, Atlanta, 1921. Licensed in California in 1923. Dr. Babcock was a member of the Los Angeles County Medical Association, the California Medical Association, and a Fellow of the American Medical Association.

BITTNER, CLARENCE LAVAN. Died in Sacramento, November 26, 1949, aged 62, of a heart ailment. Graduate of the Jefferson Medical College of Philadelphia, 1914. Licensed in California in 1915. Dr. Bittner was a member of the Sacramento Society for Medical Improvement, the California Medical Association, and a Fellow of the American Medical Association.

DERRICK, JOSEPH STEPHEN. Died in Los Angeles, November 16, 1949, aged 67, of a heart attack. Graduate of Tufts College Medical School, Boston, 1907. Licensed in California in 1909. Dr. Derrick was a member of the Los Angeles County Medical Association, the California Medical Association, and the American Medical Association.

GIBBONS, MORTON RAYMOND. Died in San Francisco, November 8, 1949, aged 76, of acute monocytic leukemia. Graduate of the Cooper Medical College, San Francisco, 1897. Licensed in California in 1898. Dr. Gibbons was a member of the San Francisco County Medical Society, the California Medical Association, and a Fellow of the American Medical Association.

LEE, HELEN. Died in San Jose, October 28, 1949. Graduate of the University of Michigan Homeopathic Medical School, Ann Arbor, 1905. Licensed in California in 1906. Dr. Lee was a member of the Santa Clara County Medical Society, the California Medical Association, and the American Medical Association.

LINDE, FREDERICK GEORGE. Died in San Francisco, November 7, 1949, aged 59, of a heart attack. Graduate of the University of California Medical School, Berkeley-San Francisco, 1916. Licensed in California in 1916. Dr. Linde was a member of the San Francisco County Medical Society, the California Medical Association, and a Fellow of the American Medical Association.

LOWY, EMIL. Died in San Francisco, September 6, 1949, aged 63. Graduate of Medizinische Fakultät der Universität, Wien, 1913. Licensed in California in 1940. Dr. Lowy was

a member of the San Francisco County Medical Society, the California Medical Association, and the American Medical Association.

McGINTY, ARTHUR THOMAS. Died in San Jose, November 3, 1949, aged 75. Graduate of the University of California Medical School, Berkeley-San Francisco, 1902. Licensed in California in 1902. Dr. McGinty was a member of the Santa Clara County Medical Society, the California Medical Association, and the American Medical Association.

PARKER, TRUMAN ALFRED. Died in La Jolla, September 4, 1949, aged 74, of myocarditis and arteriosclerosis. Graduate of the University College of Medicine, Richmond, 1899. Licensed in California in 1914. Dr. Parker was a retired member of the San Diego County Medical Society, the California Medical Association, and an Associate Fellow of the American Medical Association.

POHEIM, JOSEPH FRANCIS. Died in San Francisco, November 13, 1949, aged 72, of cirrhosis of the liver. Graduate of the Cooper Medical College, San Francisco, 1898. Licensed in California in 1898. Dr. Poheim was a member of the San Francisco County Medical Society, the California Medical Association, and the American Medical Association.

RYDHOLM, CARL OLIVER. Died in Pomona, November 6, 1949, aged 48, of a heart attack. Graduate of Northwestern University Medical School, Chicago, 1932. Licensed in California in 1932. Dr. Rydholm was a member of the Los Angeles County Medical Association, the California Medical Association, and the American Medical Association.

SULLENBERGER, PERRY K. Died in Eureka, October 27, 1949, aged 30, of a cerebral vascular accident. Graduate of Northwestern University Medical School, Chicago, 1944. Licensed in California in 1947. Dr. Sullenberger was a member of the Humboldt County Medical Association, the California Medical Association, and the American Medical Association.

SMITH, JAMES FRANKLIN. Died September 27, 1949, aged 76. Graduate of the Cooper Medical College, San Francisco, 1894. Licensed in California in 1895. Dr. Smith was a retired member of the San Francisco County Medical Society, and the California Medical Association.

THORPE, ARTHUR CLYDE. Died in Los Angeles, November 9, 1949, aged 82. Graduate of the University of Minnesota Medical School, Minneapolis, 1897. Licensed in California in 1898. Dr. Thorpe was a member of the Los Angeles County Medical Association, the California Medical Association, and a Fellow of the American Medical Association.

Morton R. Gibbons 1873-1949

There recently passed from the medical scene in this state a man who commanded the respect and esteem of his confreres to a degree enjoyed by very few physicians in our time. By his forthright conduct in all matters, Morton Gibbons did credit to a pioneer medical family in which he was a member of the third generation.

He was graduated from Cooper (later Stanford) Medical School in 1897 and practiced medicine in San Francisco for half a century. Like his father

and grandfather before him he became active in the affairs of organized medicine and in time came to be recognized as a man of singular fair-mindedness and sound judgment. Thus it happened that when the California Industrial Accident Law was passed about 1914, and the machinery established to effectuate it, Morton Gibbons, then in his early forties, was chosen as the first medical director. Here was a task to try the abilities of the most gifted medical administrator. By his tact and integrity Morton Gibbons succeeded where most others would have failed, and filled that difficult position until 1932.

During this period Dr. Gibbons did not relinquish his practice entirely, but devoted a few hours daily to his patients. And, as usual, he also found time for other activities, for his favorite pastime of yachting; as a director of the California Academy of Medicine, and also of his county medical society, which he served as president in 1923.

For the duration of World War I, Dr. Gibbons was on leave of absence from his position of medical director with the Industrial Accident Commission and entered the Army as a captain. Before the war's end he had been advanced to the rank of colonel.

In addition to the services to his county medical society already mentioned, Dr. Gibbons represented San Francisco in the House of Delegates of the California Medical Association. There he did outstanding work upon committees to which he was assigned; so, in an ever-widening circle, his capabilities were becoming recognized. As a tribute his colleagues elected him president of the State Association in 1930, a position which he filled with honor both to himself and to the society. Small wonder that Morton Gibbons advanced from one position of trust and responsibility to another. One glance at his kindly eyes, with the square jaw and firm mouth below, was sufficient to convince anyone that here was a man who would play fair, and hard; but, moreover, would demand and insist that others do the same.

About 1935 the political "do-gooders" began to bestir themselves and cast covetous eyes at medicine as one of the easily secured stones in the construction of their welfare state. The counsel of Dr. Gibbons was invaluable in the long fight within the state association over the issue of compulsory vs. voluntary sickness insurance. After years of consideration, marked often by bitter controversy, in the House of Delegates, it was finally decided to organize a voluntary insurance plan, with medical service rather than money as our capital. When it came time to select a medical director for the infant California Physicians' Service, there seemed only one man qualified by experience and talents to fill the difficult position. To this task Morton Gibbons brought the same tact, sagacity and industry which he had demonstrated that he possessed in many former positions. And they paid off with success in a situation, which, to say the least, was an onerous one.

Being the man he was, it was not to be expected that Morton Gibbons could confine his public interests to medicine alone. He early became a member of, and later a force in, the Commonwealth Club. This writer first came to appreciate this remarkable man's capabilities twenty-five years ago, when serving as a member of a public health section committee of the club, of which Dr. Gibbons was chairman. From one position to another he advanced in this civic organization, until he was elected president for the biennium of 1949-50. He was thus preparing to enter the second year as helmsman of this organization when death called him from his duties.

Included in the host of California physicians who mourn his passing are his son, Dr. Morton R. Gibbons, Jr.; a brother, Dr. Henry W. Gibbons; and a nephew, Dr. Henry Gibbons, III.

Our profession is better for his having lived and served it, and his loss is well-nigh irreparable. To a man of impeccable integrity, hail and farewell.

J. MARION READ



NEWS and NOTES

NATIONAL • STATE • COUNTY

ALAMEDA

Dr. T. Eric Reynolds was elected president of the Alameda County Medical Association, **Dr. Dorothy M. Allen** vice-president and **Dr. Lester B. Lawrence** secretary-treasurer in the November balloting of that organization. In addition, seven delegates to the California Medical Association were elected: **Dr. K. W. Benson**, **Dr. John Blum**, **Dr. James Graeser**, **Dr. Ernest Henderson**, **Dr. Arthur Hunnicutt**, **Dr. Paul Michael**, and **Dr. James Raphael**.

CONTRA COSTA

A committee of four physicians for the **Mt. Diablo Child Therapy Center**, now being organized, was named recently by **Dr. George Husser**, president of the Contra Costa County Medical Society. **Dr. M. C. Bolender**, chairman of the committee, said, following his appointment: "The county medical society committee approves the development of the Mt. Diablo Child Therapy Center provided it is approved and licensed by the State of California, and the medical profession of the community will willingly and voluntarily staff such an institution."

Other members of the committee are **Dr. Howard B. Flanders**, **Dr. Saul S. Steinberg** and **Dr. Douglas Toffelmire**.

LOS ANGELES

Dr. William E. Costolow was elected president and a trustee of the Los Angeles County Medical Association for 1950, it was announced last month following the reading of the report of the election committee. Others elected were: vice-president (1950), **Dr. J. Philip Sampson**; secretary-treasurer and trustee (1950), **Dr. R. O. Bullis**; trustee (five-year term), **Dr. Ben Frees**; councilorship, District No. 1 (three-year term), **Dr. J. M. de los Reyes**, **Dr. Paul D. Foster**, **Dr. J. Norman O'Neill** and **Dr. John Edward Short**; councilorship, District No. 2 (three-year term), **Dr. Edward C. Rosenow, Jr.**; councilorship, District No. 4 (three-year term), **Dr. John R. Paxton**.

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The second annual mid-winter radiological conference sponsored by the Los Angeles Radiological Society will be held February 25 and 26 (Saturday and Sunday) at the Los Angeles Biltmore Hotel. Physicians other than radiologists are invited to attend. Fee for the two-day session is \$15. In addition, there will be a charge of \$5 for those wishing to attend a banquet which is to be held Saturday night. Reservations for the meeting and the banquet should be sent, with check, to **Moris Horwitz, M.D.**, 441 North Camden Drive, Beverly Hills, California. Hotel reservations may be made by applying directly to the convention manager of the Biltmore Hotel.

PLACER-NEVADA-SIERRA

Dr. Carl Angella of Roseville has been elected president of the Placer-Nevada-Sierra County Medical Society. He succeeds **Dr. C. Conrad Briner** of Auburn. **Dr. G. D. Tipton** was elected vice-president, and **Dr. Vernon Padgett** secretary-treasurer.

SAN DIEGO

Dr. Arthur A. Marlow was elected president-elect of the San Diego County Medical Society at the annual meeting in November. He will take office as president in January, 1951, succeeding **Dr. Clarence E. Rees**, 1949 president-elect who was installed as president at the beginning of this year. **Dr. W. H. Geistweit** was elected secretary and **Dr. M. D. Redding** treasurer, both to serve this year.

SAN FRANCISCO

Election of **Dr. William L. Bender** to the presidency of the San Francisco County Medical Society was announced following count of ballots in December. **Dr. Grace M. Talbot** was elected first vice-president, **Dr. Emile Torre** second vice-president, **Dr. Allen T. Hinman**, secretary-treasurer, and **Dr. J. Marion Read** librarian.

SAN MATEO

Wilber L. Krell, administrator of Mills Memorial Hospital, was installed as president of the Association of Hospitals at the recent annual meeting of that organization in Santa Barbara.

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Appointment of a full-time executive secretary and the opening of an office to conduct the business of the society were announced last month by the San Mateo County Medical Society. The executive secretary is **Robert L. Wood, Jr.**, and the office is in Mills Memorial Hospital, 95 South El Camino Real, San Mateo. The San Mateo organization, with 171 members, thus becomes the ninth of 40 county medical associations in the state to employ the services of an executive secretary. Others are Alameda, Los Angeles, Fresno, Kern, San Diego, Orange, San Francisco and Santa Clara.

SANTA CLARA

Dr. W. Elwyn Turner, health officer of Santa Clara County, was elected president of the California State Conference of Local Health Officers at a meeting last November. **Dr. J. B. Askew**, San Diego County health officer, was elected vice-president, and **Dr. Elmer M. Bingham**, health officer of the San Joaquin Local Health District, was elected secretary. These officials serve as the executive committee of the conference during their term of office.

SANTA CRUZ

Dr. Daniel Smith of Watsonville has been elected president of the Santa Cruz County Medical Society, succeeding **Dr. Allen Pederson** of Santa Cruz. **Dr. J. C. Jacobson** was elected first vice-president and **Dr. J. A. Ludden, Jr.**, second vice-president. **Dr. S. B. Randall** was reelected secretary-treasurer. **Dr. Randall** and **Dr. Luther Newhall** were elected to the House of Delegates of the California Medical Association.

POSTGRADUATE EDUCATION NOTICES

College of Medical Evangelists, Graduate School of Medicine

Courses in Internal Medicine, Dermatology, Functional Diseases in General Practice, Urology, Neurology, Proctology, Cardiology, Ophthalmology and Varicose Veins will be offered in January and March of 1950.

Contact: H. M. Walton, M.D., Dean, Graduate School of Medicine, College of Medical Evangelists, 312 North Boyle Avenue, Los Angeles 33, California.

University of Southern California, Medical Extension Education

Course: Gastroenterology.

Date: January 17, 1950, twelve weeks, part-time.

Fee: \$50.00.

Place: Los Angeles County Hospital.

Course: Electrocardiography.

Date: January 20, 1950, twelve weeks, part-time.

Fee: \$50.00.

Place: San Diego, California.

Course: Endocrinology.

Date: January 23, 1950, twelve weeks, part-time.

Fee: \$50.00.

Place: Centinela Hospital, Inglewood.

Course: Clinical Electroencephalography.

Date: January, 1950, twelve weeks, part-time.

Fee: \$50.00.

Place: Los Angeles County Hospital.

Course: Survey Course for General Practitioners.

Date: March 13, 1950, through March 17, 1950, five days, full-time.

Fee: \$50.00.

Place: Los Angeles County Hospital.

Course: Electrodiagnosis and Electromyography.

Date: February 6, 1950, to February 18, 1950.

Two weeks, full-time.

Fee: \$100.00.

Place: Los Angeles County Hospital.

University of California, Medical Extension

Course: Applied Therapeutics.

Date: January 30 through February 1.

Course: Bone and Joint Surgery.

Date: January 30 through February 1.

Course: Special Problems in Pediatrics.

Date: February 6 through 10.

Course: Forensic Medicine.

Date: February 6 through 10.

Course: Internal Medicine and General Surgery.

Date: April 24 through 28.

Course: Psychiatry for the General Practitioner.

Date: April 24 through 28.

Contact: Stacy R. Mettler, M.D., Medical Extension, University of California Medical School, San Francisco 22, California. Fee schedule and printed program supplied on request.

GENERAL

The American Society for the Study of Sterility is offering an annual award of \$1,000, known as the Ortho Award, for an essay on the result of some clinical or laboratory research pertinent to the field of sterility. Competition is open to those who are in clinical practice as well as to individuals whose work is restricted to research in basic fields or full-time teaching positions. The prize essay will appear on the program of the annual meeting of the American Society for the Study of Sterility, which is to be held at the Sir Francis Drake Hotel in San Francisco on June 24 and 25, 1950.

Full particulars may be obtained from the secretary, Dr. Walter W. Williams, 20 Magnolia Terrace, Springfield, Massachusetts. Essays must be in his hands by April 1, 1950.

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The annual meeting of the American College of Allergists will be held at the Hotel Jefferson, St. Louis, Mo., January 15-18, 1950.

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Increases in fees for physicians who examine applicants for life insurance have been put into effect by seven life insurance companies in addition to those listed some time ago by the Bureau of Medical Economics Research, according to the *A.M.A. Secretary's Letter* dated November 11, 1949. The seven additional companies are Connecticut Mutual, Equitable Life Assurance, Fidelity Mutual, Manhattan Life, Home Life, Guardian, and New York Life.

As plans are being made for a cocktail party at El Cortez Hotel for members of the Section on Eye, Ear, Nose and Throat who attend the California Medical Association Annual Session in San Diego, April 30-May 3, officers of the section have asked that members arrange to stay at that hotel. Requests for room reservations at El Cortez may be had by addressing Elwood T. Bailey, general manager, Convention Bureau, Inc., 449 West Broadway, San Diego. Applicants should mention that they are members of the Section on Eye, Ear, Nose and Throat.

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The Second Annual Scientific Assembly of the American Academy of General Practice will be held in St. Louis, Missouri, February 20 to 23, 1950. Official delegates from the California Chapter of the American Academy of General Practice will be Dr. L. C. Burwell, Los Angeles, and Dr. John G. Walsh, Sacramento. Dr. Walsh, as alternate, replaces the late William R. Harder, Los Gatos. Dr. Warren Austin, Santa Barbara, is an alternate delegate.

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Advance registrations are being accepted from those who wish to attend the Fourth International Congress of Obstetrics and Gynecology to be held in New York May 11-14, according to announcement by Dr. Fred L. Adair, secretary of the National Federation of Obstetric-Gynecologic Societies. The registration fee is \$10, and registration may be arranged by writing to Dr. Adair at 161 East Erie Street, Chicago, Illinois.

A regional **postgraduate seminar**, conducted by the California Medical Association Committee on Postgraduate Activities, was held December 10 at Redding. The 14 physicians who attended commended the meeting as practical and useful. The afternoon program was: Persistent Somatic Pain—Post Trauma Muscle Spasm and Trigger Points, by Charles O. Bechtol, M.D.; Surgical Aspects of Peripheral Vascular Diseases, by Dexter N. Richards, Jr., M.D.; High Points of Endocrinology, by Lloyd F. Hawkinson, M.D.; Dermatology in General Practice, by Raymond Allington, M.D. At the evening meeting, Antibiotics Since Streptomycin was discussed by Windsor Cutting, M.D.

A similar general program will be held for physicians in the **central San Joaquin Valley** counties at the Hughson Hotel in Modesto on Thursday, January 19. A heart symposium will be held in Merced on Friday, March 3.

The annual sale of **Easter Seals** to provide funds for rehabilitation of crippled children will be held March 9 to April 9, according to announcement of the California Society for Crippled Children.

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A **new insigne** which physicians licensed to practice in California may attach to the license plates on their cars has been approved for use, according to recent announcement by the California Highway Patrol. It is to be used to provide exemption from provisions of the state speed law when a physician is answering an emergency call. Made in the form of a shield, the new streamlined metal insigne shows a gold caduceus on a blue background, with gold letters reading "California Licensed Physician."



BOOK REVIEWS

ZINSSER'S TEXTBOOK OF BACTERIOLOGY. Ninth Edition. Revised by David T. Smith, M.D., Donald S. Martin, M.D., Norman F. Conant, Ph.D., Joseph W. Blad, M.D., Grant Taylor, M.D., Henry I. Kohn, M.D., and Mary A. Poston, M.A. Appleton, Century, Crofts, Inc., New York, 1948. \$10.00.

This well known textbook, first published in 1910, has appeared in its ninth edition. Under the guidance of Hans Zinsser, Phillip Hanson Hiss, and Stanhope Bayne-Jones, it established itself as one of the outstanding works in the field. Now it has been revised by a group of workers at Duke University headed by David T. Smith. Rewriting has been very extensive and on the whole is remarkably up to date. Material is presented in a manner which permits satisfactory clinical orientation on the part of the student but a minimum of consideration is given to the clinical features of infectious disease. This seems to the reviewer to be most satisfactory since textbooks and monographs must invariably be consulted for adequate descriptions of the nature of such disorders in any case.

The sections devoted to the nature of bacteria and host-parasite relationship are good, as are those describing the pathogenic bacteria. More unusual, in a one-volume text, are the excellent sections devoted to rickettsial and virus disease, and to the fungi. The interest of several of the authors in infection by the last group of agents is well known. A concluding section describes methods for the study of microorganisms and the isolation of such agents from patients. This material is presented very concisely and should be of considerable value to the medical student and physician. In the opinion of the reviewer this is the best one-volume textbook of bacteriology for medical students and physicians.

ATLAS OF OBSTETRIC TECHNIC. By Paul Titus, M.D., Obstetrician-Gynecologist to St. Margaret Memorial Hospital, Pittsburgh; Secretary, American Board of Obstetrics and Gynecology. Illustrations by E. M. Shackelford. Second Edition. The C. V. Mosby Company, St. Louis, Mo., 1949. \$8.50.

As stated in the preface to the first edition, "This book undertakes to present in pictorial form (line drawings), with short titles, the subject of modern obstetric technique now accepted as standard for normal and operative deliveries, as well as for various complications of pregnancy and the puerperium. It includes also a section on the technique of sterility studies." Text is limited to a few brief comments at the beginning of each section, and to short supplementary descriptions of the procedures depicted. At the end of each section there are several blank pages so that one might record one's own observations and sketches. There are sections on pelvimetry, minor and major operations during pregnancy, abortion, ectopic pregnancy, cesarean section, induction of labor, and the usual vaginal procedures associated with obstetrics, such as normal delivery, forceps operations, version and extraction, breech extraction, destructive operations, packing of the uterus, etc.

The pictorial and written descriptions of the procedures chosen for consideration are adequate in most instances. The selection of procedures is somewhat arbitrary, however; often very popular operations are omitted. For example, the Latzko extraperitoneal cesarean section is not described, and in the section on sterilization operations, the Madlener, cornual resection, and Aldridge techniques are the only ones mentioned. In the section on forceps operations, the Barton forceps and their uses are not considered at all.

One is at somewhat of a loss to know to whom this book is addressed. Possibly it would be of value to hospital house officers and to men doing only a moderate amount of obstetrics along with their general work. For anyone who has had training in the specialty it is somewhat elementary.

THE EPIDEMIOLOGY OF HEMOLYTIC STREPTOCOCCUS, DURING WORLD WAR II IN THE UNITED STATES NAVY. By Alvin F. Coburn, M.D., the Rheumatic Fever Research Institute, Northwestern University Medical School, and Donald C. Young, M.D., Medical Director, Communicable Disease Service, Herman Kiefer Hospital. The Williams and Wilkins Company, Baltimore, 1949. \$4.00.

Hemolytic streptococcus infection was a major problem to the armed forces of the United States in World War I. Principal interest was attached to the association of these organisms with influenzal pneumonia during the great pandemic. Numerous outbreaks, however, of scarlet fever were observed and, in areas where this situation prevailed, there was a striking increase in acute articular rheumatism. The association between streptococcal infection and joint disease was not appreciated, nor was it realized that the arthritic disorders were indeed rheumatic fever. Clinical, epidemiological, and bacteriological information was not obtained in regard to epidemic streptococcal infection of the respiratory tract during that war. The rapid mobilization of troops after the entry of the United States into World War II in 1941 was again accompanied by extensive outbreaks of hemolytic streptococcal respiratory infection. These were most severe in the northeastern area and in a belt running southward along both sides of the Rocky Mountains. Extensive investigation of these outbreaks was carried on by the Army Epidemiological Board, the Rheumatic Fever Control Program of the U. S. Army Air Force, and by the U. S. Navy. Dr. Coburn has summarized the magnitude of the streptococcal problem in the Navy during World War II and the results of investigation by epidemiological units. He has portrayed well the disastrous results of epidemic streptococcal infection and accompanying rheumatic fever.

A typical naval training station in a northern area is described as is the spread of streptococcal infection through it. Certain of the author's suggestions as to the mode of spread of these organisms through such a training station are speculative and not susceptible of proof at the present time. He later describes the introduction and failure of mass sulfonamide chemoprophylaxis, the development of resistant strains, and the spread of such resistant streptococci to a number of naval activities throughout the country. The last half of the book is devoted to a discussion of the role of contamination of extra-human reservoirs in the transmission of streptococcal disease and to certain information in regard to laboratory and other methods used by the epidemiological units. In his concluding chapters Dr. Coburn discusses measures to be used during a mobilization of troops at some future time to prevent the spread of streptococcal infection. It is disturbing to realize that, in spite of the detailed studies carried out by the Navy and by the other military groups, no new measures for the control of streptococcal infection have been devised. Dr. Coburn makes certain suggestions in regard to the construction of camps and better isolation methods but, in the opinion of the reviewer, the only improvement that may be made over the techniques available during the last war would be the elimination of training centers in the northern part of the United States. The rec-

ords of all investigations show that streptococcal disease was not an important problem in the south and that rheumatic fever occurred less frequently in this area.

Dr. Coburn's book will not be of great interest to the practitioner but contains a wealth of information for the epidemiologist and others interested in infectious disease. It should also be required reading for all those responsible for the administration of medical services in the armed forces should mobilization of troops on a large scale again be necessary.

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FUNDAMENTALS OF OTOLARYNGOLOGY, a Text-book of Ear, Nose and Throat Diseases. By Lawrence R. Boies, M.D., Clinical Professor of Otolaryngology, University of Minnesota Medical School, and Associates. W. B. Saunders Company, Philadelphia, 1949. \$6.50.

The first few sentences of the preface read, "This book is the outgrowth of a plan for teaching the undergraduate medical student the fundamentals of otolaryngology. As a textbook it is not only designed to offer this basic instruction to the student but also to provide fundamental information to the physician who is not a specialist. It is not intended as a complete reference book." The authors have made a sincere effort to keep the volume within these stated limits and have achieved more than the expected success. They are to be commended for a product that is singularly free from recapitulation, rewriting or direct incorporation as a whole or in part of the many outmoded procedures, practices and theories that too often comprise up to one-third of the average text. This is refreshing. Whether or not the reviewer agrees with or employs implicitly or explicitly—and he does not—the theoretical expositions, method of diagnosis and proposed therapy, whether it be medical or surgical, would be beside the point were it not for the fact that such concord or disagreement acts as a baseline for the following criticisms and commendations. However, it is freely admitted that should every medical student and physician who is not a specialist have available and use intelligently the information available in this volume the otolaryngologic problems would be handled in a far more satisfactory manner than is the present custom.

The book is divided into three approximately equal sections: Part I, The Ear; Part II, The Nose; and Part III, The Throat. The section on the ear is good except for Chapter IX on Vertigo that seems somewhat involved for the novice and general practitioner. One has to read through several paragraphs to find that the direction of nystagmus is designated as being in accord with the quick component. The description of the internal workings and cost of the mechanical aids to hearing in Chapter X is interesting but not sufficiently detailed to permit discussion of the subject with the detail man, intelligent evaluation of the advertising claims or of real value to posterity.

Part II devoted to the nose is excellent in all respects. Chapter XV that deals with chronic nasal obstruction could be improved by at least mentioning several of the general conditions whose local manifestations produce nasal obstruction. The chapters devoted to the accessory nasal sinuses are adequate and present the modern attitude of conservation in diagnosis, therapy and surgery. Chapter XIX—Epistaxis—could be enlarged by at least 50 per cent and still not devote an unwarranted amount of space to this subject. This could be done at the expense of the following chapter on Atrophic Rhinitis.

Part III—The Throat—irritates one in the very first chapter (XXII) by referring the reader to subsequent chapters for details in regard to the nasopharynx and retropharynx. Chapter XXVII—Hoarseness—devotes most of its contents to paralyzes and rather skims over the more common and more frequently encountered causes for hoarseness. Chapter

XXX in discussing anesthesia for esophagoscopy states, "Local anesthesia for adults is quite satisfactory. The procedure is usually surprisingly comfortable for the patient." Before one swallows this statement one should try an esophagoscope. Chapter XXXII—Prescription and Therapeutic Procedures—offers ground for considerable differences of opinion. The reviewer is wholly opposed to the use of an all glass laryngeal syringe even in the hands of the expert. It frequently happens that the prescriptions are outmoded by the time the book comes off the press.

In summary it is an excellent textbook. It is well made, printed in good type on gloss paper and contains numerous clear though in some instances poorly selected illustrations. The table of contents is extensive and adequate. The index is satisfactory. It is recommended to not only the direct objectives—the medical student and the practitioner who is not a specialist—but to all otolaryngologists.

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OPERATIONS OF GENERAL SURGERY. By Thomas G. Orr, M.D., Professor of Surgery, University of Kansas School of Medicine, Kansas City, Kansas. Second Edition. With 1700 Step-by-Step Illustrations on 721 Figures. W. B. Saunders Company, Philadelphia, 1949. \$13.50.

The second edition of this book has numerous additions in each chapter. All of the newer developments in cardiovascular surgery have been added, and the techniques for esophagectomy and total gastrectomy are clearly described. A good balance between description and illustration has been obtained, so that it is quite easy to visualize the main technical points of each section. The author has selected the most acceptable methods of dealing with the common surgical problems, but he will find many who disagree with his statements about local excision of gastric ulcer. The volume has been devised for the beginner as well as the practicing general surgeon, and for both it will be found useful.

It should prove to be an excellent quick reference book for the busy surgeon.

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MYCOSES AND PRACTICAL MYCOLOGY, A Handbook for Students and Practitioners. By N. Gohar, M.R.C.S. (Eng.), L.R.C.P. (Lond.). Assistant Professor, Parasitology and Mycology, Department of Clinical Pathology, Kasr El Ainy Faculty of Medicine, Fouad I University, Cairo, Egypt. The Williams and Wilkins Company, Baltimore, 1948. \$6.00.

Increased interest in fungus disease has been reflected by the publication in recent years of several texts describing this group of infectious agents and the diseases caused by them. The present work, by an English author, is the least satisfactory of those that have come to the attention of the reviewer. The classifications used seemed needlessly complex. More than 20 species of pathogenic actinomycetes are described. For clinical purposes, segregation of these organisms into the anaerobic and the aerobic (nocardia) types is entirely adequate. The discussion of coccidioidomycosis is entirely inadequate and indicates that the author has not seen many of the studies published in this country in the last ten years. Histoplasmosis is mentioned but its possible association with nontuberculous calcification of the lung has been omitted. Ten pages have been devoted to a discussion of sprue, which the author admits is probably not a disorder resulting from infection of the gastrointestinal tract by monilia (Candida), and similarly, considerable space is devoted to fungus infections of the eyes, ears, and genitourinary tract. These are probably not of sufficient clinical importance to require such extensive treatment.

The last half of the book is devoted to a general discussion of fungus disease of the skin, which the reviewer did not feel qualified to discuss in detail. The etiological agents are segregated into a bewildering number of species, so many

separate syndromes are described, and the suggested therapy is so obscure that it seems unlikely that any physician could manage patients adequately on the basis of the information contained herein. This book cannot be recommended.

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A TEXTBOOK OF NEUROPATHOLOGY with Clinical, Anatomical and Technical Supplements. By Ben W. Lichtenstein, B.S., M.S., M.D., Associate Professor of Neurology, University of Illinois College of Medicine. Illustrated. W. B. Saunders Company, Philadelphia. 1949. \$9.50.

This excellent volume is much more than a textbook of neuropathology. It is a clear, concise presentation of neurological syndromes from a pathological standpoint. The author states that it was primarily designed for medical students and those training in neurology, neuropsychiatry and neurosurgery, and in this he has more than surpassed his primary objective. For the teaching of neurology and neurosurgery, there are available many very comprehensive works pertaining to either field alone, but there is no other volume available which combines the important clinical and pathological aspects in such an understandable manner. To those beginning the study of neurology and neurosurgery, it should prove to be an indispensable text.

As a reference book for those more experienced in the treatment of diseases of the nervous system, the excellent bibliography at the end of each chapter should prove to be of great value. An added feature is the chapter termed Clinical Supplement in which definitions and brief descriptions of the many syndromes are presented. The chapter concerning neuropathological technique might prove to be of value purely as a reference but constitutes only a small portion of the textbook and is probably of much less general interest than the material in the remainder of the book.

The illustrations are of excellent technical calibre, well chosen, and add greatly to the value of a book which can be highly recommended to every individual interested in the treatment of diseases of the nervous system.

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SYNOPSIS OF HERNIA. By Alfred H. Iason, M.D., Attending Physician, Adelphi Hospital, Director of Surgery, Brooklyn Hospital for the Aged. Grune and Stratton, New York, 1949. \$6.50.

This book, as the author states in his preface, is a condensation of his previous book on hernia published in 1944. In so condensing his original book, Dr. Iason has eliminated many of its most interesting sections, namely those on the historical background, the theories of etiology, and the excellent discussion of the medicolegal aspects.

Surgeons operating on hernias would profit by familiarity with the original book. Medical students, and those general men doing occasional operations for hernia will find Dr. Iason's latest book exactly what its title describes it as being, a synopsis of hernia. It covers the various types of hernia, from common inguinal to rare pelvic in all their aspects, including anatomy, etiology, signs and symptoms, various types of surgical treatment thereof and finally an enlightening chapter on recurrences. It is clearly and concisely written and fairly well illustrated.

Those surgeons wishing to keep abreast of the latest developments in the anatomy and surgical technique of hernias will find that this book does not contribute anything significantly new to the subject and will profit more by reference to the many excellent papers in the recent literature.

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A TEXTBOOK OF PHARMACOGNOSY. By George E. Trease, B.Pharm., F.R.I.C., F.L.S., Reader in Pharmacognosy and Head of the Department of Pharmacy in the University of Nottingham. Revised, Fifth Edition. The Williams and Wilkins Company, Baltimore, 1949. \$8.00.

Pharmacognosy is the science having to do with the recognition of the nature and value of drugs, and more especially of drugs of plant origin. The subject matter includes the

plant source, the gross and microscopic appearance of the medicinal portion of the plant and the chemical nature of its active principles. This book by George Edward Trease covers the subject as completely as is possible in a book of 800 pages, and is well illustrated with photographs and sketches of drugs plants and parts. The book is composed of five parts entitled General Principles, Drugs of Vegetable Origin, Drugs of Animal Origin, Chemistry, and Microscopy. Important chapters are on Commerce in Crude Drugs, with many illustrative photographs, Cultivation of Medicinal Plants, The Collection, Drying and Curing of Drugs, chapters describing the separate phyla of drug plants, Constitution of Drugs, Microscopical Study of Drugs and The Examination of Powdered Drugs. The book is of value not only to the pharmacist, but also to the physician who is interested in knowing the character of the materials going into the compounding of his prescription.

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EARLY CARCINOMA OF THE UTERINE CERVIX—Pathogenesis and Detection (Revised and Augmented Edition). By Hansjakob Wespi, M.D., Chief of the Obstetrical and Gynecological Department, Frauenfeld Hospital, Aarau, Switzerland. Grune and Stratton, Inc., New York, 1949. \$6.50.

This small volume is a translation by Marie Schiller of a monograph finished in 1943, first published abroad in 1946, and now revised by the addition of references to American papers of recent years, particularly those dealing with exfoliative cytology. The book is divided into four parts, the first being a foreword of 25 pages written by Walter Schiller and having very little to do with the rest of the volume. Parts two and three, comprising the bulk of the monograph, deal with colposcopy as employed by Wespi in nearly four thousand cases seen in the obstetrical and gynecological department at the University of Zurich. The histology of the normal and pathological cervical mucosa is presented and numerous case reports are given in detail. The concluding section discusses the development of carcinoma from various atypical varieties of epithelium and offers some rambling remarks on the origin of cancer. There is a bibliography of 235 items, followed by 95 figures, most of them good reproductions of photomicrographs of early carcinomatous lesions. Basically this monograph is a plea for the use of colposcopy in the diagnosis of early cervical carcinoma. It seems unlikely, however, that the colposcope—never popular with American gynecologists—will ever be widely used now that exfoliative cytology has become such a reliable diagnostic tool. Despite its belated appearance, this book contains many interesting observations, and it is recommended to all gynecologists and pathologists.

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A DESCRIPTIVE ATLAS OF RADIOGRAPHS—An Aid to Modern Clinical Methods. By A. P. Bertwistle, M.D., Ch.B., F.R.C.S., Ed. Seventh edition, revised and enlarged. 980 illustrations. The C. V. Mosby Company, St. Louis, 1949. \$16.00.

In the first chapter of this book entitled "Milestones in Radio-Diagnosis," an excellent historical summary is given of the important discoveries of x-ray methods of examination of various systems of the body. The remaining portion of the book consists of illustrations of radiographs which are accompanied by condensed descriptions and sometimes brief case histories. Much worthwhile material is thus presented, but the absence of an explanatory text makes the book somewhat fragmentary.

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MALIGNANT DISEASE AND ITS TREATMENT BY RADIUM—Volume II. By Sir Stanford Cade, K.B.E., C.B., F.R.C.S., M.R.C.P., Surgeon, Westminster Hospital, Mount Vernon Hospital and Radium Institute. Second edition. The Williams and Wilkins Co., Baltimore, Md., 1949. \$12.50.

Volume II of this series of three volumes deals with malignant disease of the mouth, pharynx, larynx, and neck

—anatomical areas in which radiotherapy has much to contribute in the treatment of patients. While the book is limited largely to the method of employment of interstitial radium therapy, this subject is covered well and with adequate diagrams showing appropriate dosages. X-ray therapy dosage is also given, and the choice of surgical operation or electrocoagulation as methods of treatment is discussed. The numerous illustrations, some of which are in color, add materially to the value of the book.

BLAKISTON'S NEW GOULD MEDICAL DICTIONARY. Harold W. Jones, M.D., Normand L. Hoerr, M.D., and Arthur Osol, Ph.D., Editors. 252 illustrations on 45 plates. First edition. The Blakiston Company, Philadelphia, 1949. \$8.50.

This book is not a revision of Gould's Medical Dictionary, but, in the editors' words, a complete new reference work. It not only brings definitions of traditional medical terms abreast of current usage but also defines words recently brought into use in medical literature. Noteworthy is a definition of the word *allergy*: "Altered reaction capacity to a specific substance which will cause no symptoms of hypersensitivity in the nonsensitive." It is pleasant to note that by including the word *capacity* in the definition, the editors have held aloof from current (and rife) misusage.

A helpful feature is that trade names of medicinal products are included, always with notation that the name of the product is trademarked or proprietary.

The typography is such as to save time for the user. Words listed as sub-entries below the parent word are vertically aligned flush with a slightly indented left-hand margin. The eye need move only downward along the edge of the column to find the word being sought. This is a distinct improvement over the usual practice of scattering sub-entries like needles in a haystack of type below a main entry.

CLINICAL BIOCHEMISTRY. By Abraham Cantarow, M.D., Professor of Biochemistry, Jefferson Medical College, and Max Trumper, Ph.D., Commander, H(S), USNR, Lecturer in Clinical Biochemistry and Basic Science Coordinator, Naval Medical School, Bethesda, Maryland. Fourth edition. W. B. Saunders Company, Philadelphia, 1949. \$8.00.

This is certainly one of the best texts on clinical biochemistry. It attempts to translate current biochemical knowledge into clinical practice and it succeeds remarkably well in this attempt. The coverage is broad, yet sufficiently detailed. The authors write from a wide personal experience. They also have an extensive bibliography for general subjects and specific statements at the end of each chapter; from these the reader may follow up any investigation he desires.

This, the fourth edition, has extensive revisions on acid-base balance; pigment metabolism in relation to jaundice; carbohydrate, lipid and protein metabolism; thyroid function; adrenal function; absorption and storage of iron;

action of parathyroid hormone; renal physiology; vitamins and experimental diabetes. Newly added material includes chemical changes in shock; thymol turbidity and flocculation tests; fatty liver; the crush syndrome; alarm reaction; goitrogenic agents; and new methods of studying adrenocortical function.

The book is a valuable reference for both practitioners and students.

TEXTBOOK OF MEDICAL TREATMENT. By Various Authors, Edited by D. M. Dunlop, M.D., L. S. P. Davidson, M.D., and J. W. McNeew, M.D. Fifth edition. The Williams and Wilkins Company, Baltimore, 1949. \$8.50.

This is the fifth edition in ten years of a standard British text of treatment. It has been written for both students and practitioners to provide a moderate sized text in which the information should be clear and explicit. However, there is much that may be criticized in the volume.

The arrangement of the chapters is unusual and without adequate reason as far as this reviewer can discover. The order begins: Infectious Diseases, Sulphonamide Drugs, Penicillin, Antihistaminic Drugs, Dehydration and Hypochloremia, Tuberculosis, Common Diseases of the Skin, Venereal Diseases, etc., etc.

The style itself of the book will probably limit its use largely to the countries in the sterling bloc. The idioms (particularly the medical idioms) will require translating for the average American student not brought up on weights in stone nor weighing in minims. The individual collaborators use either the metric or apothecary system as they choose. This breeds confusion—the avoidance of which is the avowed purpose of the editors. In the preface it is stated that the apothecary system has been used in deference to the practitioner but that an approximate metric equivalent has been included in brackets after each dose to encourage the use of the metric system. These equivalents are sometimes carried out to odd decimal points which will discourage even the most ardent proponent of this system.

In general the book is conservative in its outlook on newer methods. The treatment of diseases of the liver is incomplete and includes much which is outworn. The dosage of quinidine recommended for paroxysmal tachycardia is homeopathic. Aluminum hydroxide and magnesium oxide have failed. There is no discussion of antibiotics in the broad sense. The entire write-up on these substances is outdated; streptomycin is described as being in the experimental stage in tuberculosis; aureomycin does not appear; and penicillin is still in the every-four-hour dosage stage.

There is no bibliography at the ends of the chapters—an inclusion which would help the student. There are appendices, however, which include a conversion table for weights and measures and a list of official preparations with their proprietary equivalents. Forty pages are devoted to technical procedures.

This book can be recommended to American students and practitioners only for its comparative interest.

